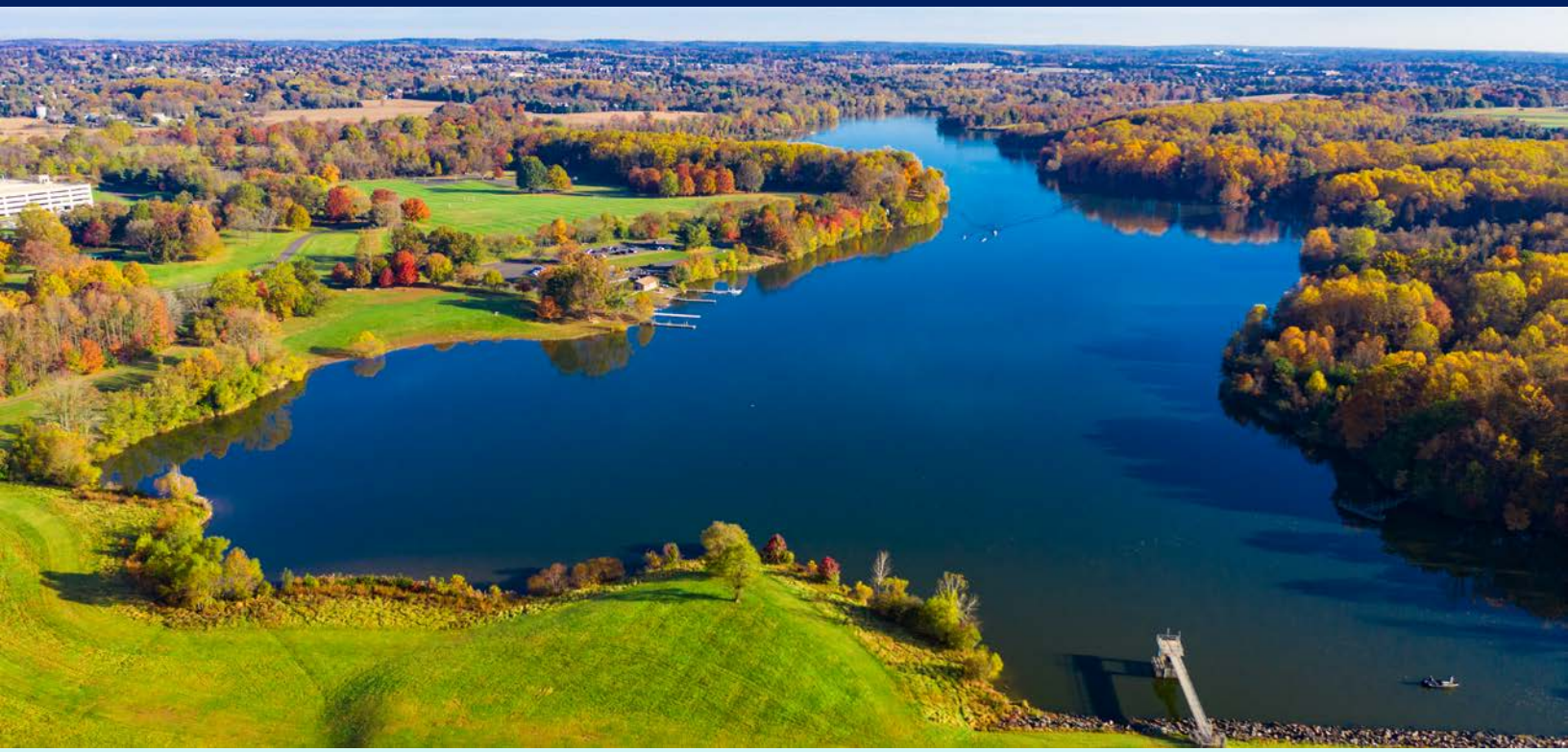
TOWNSHIP OF

MIDDLETOWN

BUCKS COUNTY

CLIMATE ACTION PLAN



Local Actions and Policies to Reduce Middletown Township's Greenhouse Gas Emissions

SUSTAINABLE PENNSYLVANIA
PROSPEROUS COMMUNITY, HEALTHY ENVIRONMENT
CERTIFIED GOLD COMMUNITY

ADOPTED SEPTEMBER 20, 2021

Produced by the Middletown Township
Environmental Advisory Council &
the Office of the Township Manager

TOWNSHIP OF MIDDLETOWN
INDUSTRIA PROBITAS
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Credits and Acknowledgments

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External Agencies and Partners

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- Delaware Valley Regional Planning Commission (DVRPC)
- ICLEI – Local Governments for Sustainability
- Bucks County Transportation Management Association (TMA)

Utilities and Service Providers Supplying Data & Technical Assistance

- Delaware Valley Regional Planning Commission (DVRPC)
- Pennsylvania Electric Company (PECO)
- Southeastern Pennsylvania Transportation Authority (SEPTA)
- Bucks County Transportation Management Association (TMA)
- Bucks County Water & Sewer Authority
- Lower Bucks County Joint Municipal Authority
- Newtown Artesian Water Company
- Waste Management
- Republic Services of Philadelphia LLC
- Advanced Disposal
- Titan Mobile Shredding
- Air Quality Planning Section, Illinois Environmental Protection Agency (commerical rail data)

This Climate Action Plan template was made possible through a grant agreement between ICLEI – Local Governments for Sustainability and the PA Department of Environmental Protection, which was funded by the US Department of Energy State Energy Program. The original template was published in April 2018 and was later edited by PA Department of Environmental Protection in December 2019.

Table of Contents

Executive Summary

The mission of the Middletown Township Local Climate Action Plan is
to create an environmentally friendly future that improves the quality of life
by promoting environmental sustainability to residents, businesses, and the community.

With seasonal variations and catastrophic natural disasters becoming more intense and frequent, climate change threatens the health, safety, and overall well-being of communities across the globe. The Commonwealth of Pennsylvania and Middletown Township are no exception. Middletown Township recognizes a growing need to address its own contribution to climate change, both as an organization and as a community, as well as to adapt to the impacts that will occur and be exacerbated, absent local greenhouse gas reduction. This Local Climate Action Plan includes an inventory of Middletown Township's greenhouse gas emissions (GHGs) from community-wide activities, establishes an emissions reduction target, and outlines feasible actions to achieve that target. In addition, the Plan identifies ways in which GHG reduction actions can further Middletown Township's ability to adapt to climate change impacts. While this plan is not focused on adaptation, it ensures that GHG measures are not counteractive to the Township's future resilience and will hopefully be a catalyst for developing a robust strategy towards that end. As the first municipality in Bucks County to prepare a Local Climate Action Plan, Middletown Township aspires to be a role model to expand GHG reduction into other communities.

The Middletown Township Climate Action Plan addresses five sources of GHG emissions: commercial buildings (inclusive of electric and natural gas consumption); residential buildings; solid waste, composting, and recycling; water and wastewater; and transportation. **More than 95% of all GHG emissions from Middletown Township are derived from commercial and residential buildings, and transportation.** This Plan presents several objectives and mitigation strategies aimed at reducing GHG emissions from these sources. Additionally, the Plan presents several strategies for sustainably producing energy to meet the community's energy needs. Some of the mitigation strategies recommended in this study include information campaigns for residents and businesses, changes to construction requirements, and development of new programs, all with the goal of reducing GHG emissions.

The GHG emission reduction targets referenced in this Plan are based upon a GHG inventory performed by the Environmental Engineering students from Wilkes University assigned to this project. The inventory (Chapter 3) calculates GHG emissions from 2018. These calculations are based upon real data provided by local utility companies, service providers, and other emission sources. The GHG inventory describes, using empirical evidence, the current state of local GHG emissions, thus establishing a baseline that can be used to gauge the success of the Township's mitigation strategies.

Ongoing progress toward reducing GHG emissions in the coming years will be measured using the monitoring plan (Chapter 12), using quinquennial (every five years) GHG inventories prepared by the Delaware Valley Regional Planning Commission (DVRPC), which will be compared against the GHG inventory outlined in this plan, as well as prior inventories prepared by DVRPC.

The Middletown Township Climate Action Plan exceeds the reduction target outlined in the Commonwealth of Pennsylvania's 2018 Climate Action Plan. Several mitigation strategies outlined in the Middletown Township Climate Action Plan duplicate, align, or support actions of the Commonwealth's 2018 Climate Action Plan and are noted with each one.

Middletown Township's Climate Action Plan contains a variety of recommendations, both with varying costs to the municipality or its residents, though, many projects will simultaneously reduce one or more other expenses. Generally speaking, projects with a cost associated with them will be assessed at the time they are being considered for implementation. Additionally, several projects identified in this Plan will have net-positive or net-neutral impacts on both Middletown Township and/or individual residents. These positive impacts can include reduced ongoing utility costs, reduced maintenance needs, expanded job opportunities, and more. Additionally, this Plan is written in a way to allow for new future social and technological trends in sustainability to be considered to effectuate the Township's sustainability goals.

As this document is designed for long-term planning and ideation purposes, specific dollar amounts are not identified as changes in cost of living and technological advancements will affect the cost of future climate mitigation activities. Many of these projects will be funded through grant opportunities, which through this Plan, the Township is better positioned to obtain. Some projects may be funded by the Township, or through state or federal grant funding, while others may be funded by individual homeowners and businesses as they choose to act upon them. This Plan recommends extensive measures to communicate the costs *and the benefits* of these activities to all involved parties.

1. Introduction

Climate change is identified by many experts as the greatest environmental challenge of the 21st century, with overwhelming evidence in the past decade. It poses a serious threat not just to Middletown Township's natural resources, but also to our local economy and the health of our residents. Climate action also presents huge opportunities for creating a healthier, safer, and more equitable zero-carbon world. Middletown Township has an unparalleled opportunity to make changes in ways that create jobs and benefit all residents. Scientists expect that with the current trends in fossil fuel use, Americans may see more intense heat waves, droughts, rainstorms, floods, wildfires and landslides in the future. These impacts could drag down our economy, stress our natural resources and worsen inequities facing many Americans. Action is required at all levels, and local governments have a unique role to play in building low-carbon communities. In Pennsylvania, temperatures have increased by more than 1.8°F since the early 20th century and are expected to increase by an additional 5.9°F by 2050. Similarly, annual precipitation in Pennsylvania has increased by approximately 10% since the early 20th century and is expected to increase by another 8% by 2050, with a 14% increase during the winter season (Shortle et al. 2015).

These impacts are caused by the accumulation of greenhouse gas (GHG) such as carbon dioxide (CO_2) and methane (CH_4) in the atmosphere, primarily resulting from burning fossil fuels and land use changes. Although the natural greenhouse effect is needed to keep the earth warm, a human enhanced greenhouse effect with the rapid accumulation of GHG in the atmosphere leads to too much heat and radiation being trapped. Carbon emissions from human activities have continued to rise in recent decades, reaching the highest rates in human history between 2000 and 2010 (Intergovernmental Panel on Climate Change (IPCC), 2014). About half of all carbon dioxide emitted between 1750 and 2010 occurred in the last 40 years. The energy, industry and transportation sectors have dominated the rise in emissions. In Pennsylvania, the sectors responsible for the most GHG emissions are industrial at 31%, electricity production at 30%, and transportation at 23% (Pennsylvania Department of Environmental Protection (PA DEP), 2019). With the current trajectory of population growth, urbanization, and reliance on personal vehicles, emissions will only continue to rise. Given the critical impacts of climate change on humanity, the time to act to reduce GHG and our carbon footprint is now.

In addition to national and state efforts to make systemic changes that will reduce global emissions, local governments can play a powerful role in addressing climate change. The design of American communities—how we use our land, how we design our buildings, how we get around—greatly impacts the amount of energy we use and the volume of GHG emissions we produce. It is critical that communities like Middletown Township demonstrate that it is possible to dramatically reduce GHG emissions while creating more vibrant and prosperous places to live and do business.

Statewide & Regional Climate Action

In 2008, the Pennsylvania Climate Change Act was passed, requiring the Department of Environmental Protection (DEP) to (1) develop an inventory of GHG emissions and update it annually; (2) administer a Climate Change Advisory Committee; (3) set up a voluntary registry of GHG emissions; and (4) prepare a Climate Change Action Plan and Climate Impacts Assessment, both to be updated once every three years. The most recent Climate Impacts Assessment was updated in 2015, and the most recent Climate Action Plan, as well as greenhouse gas inventory, were released in 2019. These documents offer information and guidance for local climate action planning in the Commonwealth. The Climate Impacts Assessment provides a scientific basis for potential statewide impacts of global climate change, which can be used alongside available local data to inform community adaptation efforts. The PA Climate Action Plan summarizes statewide greenhouse gas emissions, sets an emissions reduction target, and describes potential mitigation and adaptation actions for residents and businesses, as well as local and state government. The reduction targets are 26% by 2025 and 80% by 2050 from 2005 levels, consistent with an executive order signed by Governor Wolf in 2019 (PA DEP, 2019).

To ensure consistency with the PA Climate Action Plan, Middletown Township's reduction targets exceed the statewide targets. In addition, many of the statewide actions were incorporated into this plan, which is described further in Chapter 4: *Taking Action*.

The Delaware Valley Regional Planning Commission (DVRPC) is the federally designated metropolitan planning organization for the nine-county region around Philadelphia in southeastern Pennsylvania and southern New Jersey. DVRPC develops and publishes a region-wide quinquennial (every five years) GHG inventory, with emissions allocated to every municipality in the area. Allocations are based upon the actual and calculated quantities analyzed by DVRPC, and allocated based upon factors relevant to the emission type (population, miles of roads, etc.).

Purpose and Scope of the Climate Action Plan

Middletown Township is joining an increasing number of local governments committed to addressing climate change at the local level, in particular through its participation in the *Ready for 100* initiative.

Middletown Township recognizes the risk that climate change poses to its residents and businesses, and is acting now to reduce the GHG emissions of both its government operations and the community at-large through the innovative programs laid out in this Climate Action Plan. Furthermore, it is recognized that Middletown Township needs to address existing climate risks such as fossil fuel dependence, the need to educate the public about how to reduce individual climate impact, and adapt its systems and infrastructure to new conditions. This Climate Action Plan takes advantage of common-sense approaches and cutting-edge policies that our municipality is uniquely positioned to implement – actions that can reduce energy use and waste, create local jobs, improve air quality, preserve our local landscape and history, reduce risk to people and property, and in many other ways benefit Middletown Township for years to come.

Purpose

By creating a clear course of action so that everyone has a role in creating and achieving climate and sustainability goals, our Climate Action Plan drives and coordinates local efforts toward a 20% reduction in GHG emissions of 2018 levels by 2030, and 80% percent below 2018 emission levels by 2050.

The Pennsylvania Climate Action Plan uses 2005 as a base year for gauging the success of GHG mitigation efforts. For the purposes of this Plan, Middletown Township is using 2018 as a base year as this data is more relevant to current conditions and accessible from the individual utilities providing it.

The Climate Action Plan is a framework for the development and implementation of actions that reduce Middletown Township's GHG emissions. The Plan provides guiding objectives and actions to realize Middletown Township's GHG reduction goal.

In addition to addressing mitigation concerns, the Climate Action Plan considers the vulnerability of Middletown Township to hazards that are and will continue to be exacerbated by climate change. The plan prioritizes GHG reduction measures that support climate adaptation and does not propose any actions that are maladaptive to foreseen climate change impacts.

Scope

This Plan covers objectives and actions for reducing GHG emissions resulting from local government and community-wide activities within the Middletown Township. It addresses the major sources of emissions in Middletown Township and sets forth objectives and actions in the following six (6) sectors that both the Township and community members can implement together to reduce greenhouse gas emissions:

- Commercial
- Residential
- Energy Production
- Waste, Composting, & Recycling
- Water & Wastewater Management
- Transportation

The Plan creates a framework to document, coordinate, measure, and adapt efforts moving forward. In addition to listing actions, the Plan discusses how each action will be implemented via timelines, financing, and assignment of responsibilities to departments, staff, or community partners where known.

A key discussion point throughout the development of this Climate Action Plan was and still is how Middletown Township is to address sources of greenhouse gas emissions that are and are perceived to be beyond the scope of the municipality. While there are elements of the above-mentioned sectors that can be more directly impacted by action of a higher level of government, there are meaningful and signficant methods well within reach of the municipality that can be implemented, communicated, and advocated for to still catalyze reductions in greenhouse gas emmissions.

Planning Process

While Middletown Township has already begun to reduce greenhouse gas emissions and climate risk through a variety of actions, this plan is a critical component of a comprehensive approach to reduce the Township's emissions. The planning process was based on the following overarching framework, developed by ICLEI – Local Governments for Sustainability, USA (ICLEI), and known as the Five Milestones for Climate Mitigation.

Figure 1: Five Milestones for Climate Mitigation

As indicated by the figure above, climate action planning is a continuing cycle and does not stop with the development of this document. However, this Climate Action Plan represents Middletown Township's first planning cycle, including the completion of the first three milestones:

Milestone 1: Chapter 3 summarizes the emissions inventory and forecast

Milestone 2: Chapter 4 sets reduction targets

Milestone 3: Chapters 5-11 outline objectives and actions

Chapter 12 also describes the initial steps of milestones 4 and 5: implementation and monitoring.

Planning Team and Stakeholders

Development of the Middletown Township Climate Action Plan began in August 2020 with the announcement of the Township's acceptance into the second year of the Local Climate Action Program, sponsored by the Pennsylvania Department of Environmental Protection (DEP) and funded by the US Department of Energy's State Energy Program (SEP). Middletown Township is proud to be the first municipality in Bucks County to participate in this program.

Middletown Township was paired with Wilkes University to develop this project and provide technical, science-based advice and direction. Under the leadership of Dr. Marleen Troy, Chair and Professor of Environmental Engineering, Earth Science, & Geology at Wilkes University, students Allie Faunce and Trevor Welsh, Class of 2022, worked to develop the greenhouse gas inventory in the fall of 2020, and student Kayla Acker-Carter, Class of 2021, helped to develop mitigation goals and strategies. Ms. Faunce and her family are long-time residents of Middletown Township.

Middletown Township is fortunate to have had an active Environmental Advisory Council (EAC) for more than 30 years. As a standing, organized group of residents advising the Township on related matters, the EAC was a natural fit to serve as the steering committee to develop this Climate Action Plan. All EAC members contributed greatly to developing the scope and mitigation strategies outlined in this document.

From the Township, Assistant Township Manager Nick Valla served as the project lead. Township Manager Stephanie Teoli Kuhls, Director of Parks & Recreation Paul Kopera, and Parks & Recreation Program Coordinator Patrick Graham provided additional assistance and direction through the development of the Climate Action Plan. Rita Wilson, Community Services Secretary, assisted in locating data on recycling throughout the community during development of the GHG inventory. Christina Bernhardt, Management Intern, assisted with the preparation of this document.

The Middletown Township EAC was informed and updated about the Local Climate Action Program and the ongoing development of the greenhouse gas inventory during the fall and winter of 2020/2021. Beginning in the spring, several planning meetings were held with the EAC in separate sessions to develop critical elements of this Climate Action Plan, with meetings held on March 10, April 14, and May 12, 2021.

In March and April, a community-wide survey was distributed via social media and the Township's website, soliciting feedback from the community about their perspectives, concerns, and ideas to be considered and included in the Middletown Township Climate Action Plan.

Social Equity

Climate equity was a core component of the planning process and will continue to be through implementation. Climate equity ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change. Implementation of this concept requires intentional policies and projects that simultaneously address the effects of and the systems that perpetuate both climate change and inequity. Under the status quo, however, not everyone is given the opportunity to participate and benefit.

Research indicates that communities of color and low-income populations have historically been under-served by programs and investments and under-represented in decision-making, including for the development and implementation of climate policy. These exclusionary processes maintain or exacerbate disparities in public health; food, energy, and housing security; air and water quality; economic prosperity, and overall quality of life. These inequities primarily stem from ongoing institutional racial bias and historical discriminatory practices that have resulted in the inequitable distribution of resources and limited access to opportunities.

It is important to note that Middletown Township, with a relatively small population of non-white residents, has critical opportunities to improve social equity among other marginalized populations, namely the elderly and lower income individuals and families, which are present in greater numbers. In the short term, climate policies will be implemented bearing these realities in mind, while monitoring changes in the composition of the community in the years to come.

Climate change is likely to amplify the impacts of existing inequities. Residents of frontline communities which often include lower income neighborhoods, communities of color, immigrants, unhoused, outdoor workers, the very young, and the elderly will disproportionately bear the burdens of climate change impacts. In addition, the many economic and health benefits of carbon reduction investments are not shared equitably across the community, especially among people of color and low-income communities. As a proactive step to ensure an equitable climate action plan, the Middletown Township had a community-driven planning process.

Vision Statements and Objectives

1. Make Middletown Township a leader in clean and local energy that comes from the sun, wind, or other innovative renewable technologies.
2. Understand potential climate-related risks and mitigate these risks while preparing our community for chronic and extreme weather events.
3. Transform Middletown Township into a community where people walk, bike, take mass transit, or carpool for most trips in a safe, accessible, and affordable transportation network.
4. Transform our buildings into high-performing places to live, work, learn, and play.
5. Ensure the benefits of climate action are equitably distributed and empower historically underserved populations to participate in the process of transitioning to a carbon-free community.
6. Aggressively transition toward a clean, carbon-free transportation system that improves health and livability for the Middletown Township community.
7. Become a leader in sustainable, smart transportation through innovative partnerships, policies, programs, and technology.

The Climate Action Plan offers a robust set of objectives and actions that will address the climate hazard vulnerabilities and aim for an 80% reduction in GHG emissions by 2050. Each action and objective was created and reviewed by a group of stakeholders who considered technology limitations, funding constraints, public support, feasibility of implementation, environmental justice considerations, and other barriers.

Middletown Township established the following targets to maintain a vibrant, healthy, and safe community for future generations, while improving the quality of life for those who live here today:

By 2021

- Adopt the 30-year Middletown Township Climate Action Plan.
- Join the *Ready For 100* initiative.
- Enact residential and commercial alternative energy ordinance.

By 2025

- Middletown Township will reduce energy use in its buildings by 10%.
- Establish a process and timeline for replacing fleet with electric.
- Purchase at least one electric vehicle.
- Develop a public education program to inform the community about different ways they can take climate action.
- Develop a strategy to implement expanded bikeway, trail, and pedestrian facilities.
- Identify at least three (3) local companies or organizations as climate ambassadors to help spread the word about greenhouse gas emissions and to partner in community mitigation efforts.

By 2030

- Middletown Township will reduce energy use in its buildings by 20%.
- Make 80% of all Middletown Township non-emergency vehicles electric.
- Make 25% of all Middletown Township Police Department vehicles electric.
- 100% of Middletown Township's electricity will come from renewable energy.
- 10% of Middletown Township's commuters will carpool, bike, or walk to work.
- 15% of Middletown Township's commuters will use public transit.
- 15% of Middletown Township's commuters will telecommute.
- Middletown Township will incentivize Leadership in Energy & Environmental Design (LEED) certification or equivalent program for new buildings.
- At least 30% of new housing units within ¼ mile of high-frequency transit are designated affordable.
- A food outlet selling fresh produce is located within a 15-minute walk of every resident.
- An emergency cooling center is located within a 10-minute walk for the most vulnerable residents (based on age, income and other factors).
- Miles of bike lane per resident in low-income neighborhoods is equal to that in higher-income neighborhoods.
- Increase annual number of households reached by low-income weatherization programs by 30%.
- Decrease the energy costs of low-income residents by 15%.

By 2040

- Reduce the community's contribution to greenhouse gas emissions by 40%.
- 100% of all Middletown Township non-emergency vehicles will be electric.
- 50% of all Middletown Township Police Department vehicles will be electric.
- 20% of all Middletown Township Public Works vehicles will be electric.

- 14% of Middletown Township's commuters will carpool, bike, or walk to work.
- 20% of Middletown Township's commuters will use public transit.
- 20% of Middletown Township's commuters will telecommute.
- 30% of light-duty vehicles will be electric.
- 25% of Middletown Township's households and businesses will participate in smart grid meter programs.
- Encourage or incentivize installation of roof-top solar on 1,000 homes occupied by low- and moderate-income residents.
- Improve energy efficiency of water distribution and treatment by 15%.

By 2050

- Reduce the community's contribution to greenhouse gas emissions by 80%.
- 100% of all Middletown Township Police Department vehicles will be electric.
- 50% of all Middletown Township Public Works vehicles will be electric.
- 100% of Middletown Township's remaining vehicles will be fueled by carbon-free fuel.
- 70% of Middletown Township's households and businesses will participate in smart grid meter programs.
- Reduce vehicle miles traveled in Middletown Township by 30%.
- 80% of Middletown Township's existing buildings will complete energy-efficiency improvements.
- 50% of Middletown Township's tenants will participate in a green lease program.
- 50% of heating fuel derived from fossil-fuels (oil, natural gas and propane) will be switched to a low-carbon fuel source and/or electric heat.
- 18% of Middletown Township's commuters will carpool, bike, or walk to work.
- 18% of Middletown Township's commuters will use public transit.
- 18% of Middletown Township's commuters will telecommute.
- 100% of public transportation will be carbon free.
- 80% of light-duty vehicles will be electric.
- 100% of Middletown Township's light- and heavy- duty vehicles will be electric or fueled by carbon-free fuel.

2. Co-Benefits of Climate Action

Greenhouse gas reduction and climate resilience are not the only beneficial outcomes of climate action plans. The following outcomes are referred to as "co-benefits," and they illustrate how taking action on climate change results in a more prosperous community.

1. Improving Public Health

Climate change mitigation activities, particularly those related to transportation, help to clean the air by reducing vehicle emissions and therefore improve public health. Mitigation activities help to engender a greater degree of choice for Middletown Township's residents. Making a variety of transit options available to residents makes for a more vibrant, livable community with shorter commute times and an improved quality of life. This creates more connected and resilient neighborhoods. As a mostly developed community, Middletown Township's ongoing challenge is to improve transportation connectivity to existing residential and commercial areas.

2. Saving Money and Reducing Risk

In addition to addressing climate change, measures taken to reduce greenhouse gas emissions have other important benefits. The most obvious of these is the potential for significant cost savings. In the year 2018, Middletown Township spent over $378,000 on energy to power buildings and operations, and $231,358 for 104,900 gallons of gasoline and diesel to fuel its vehicle fleet in 2018. Many of the measures in this plan will pay for themselves quickly by reducing direct costs, such as fuel or energy used, and also indirect costs such as maintenance. For instance, a "right-sized" vehicle fleet is less expensive to purchase and fuel, while also being less costly to maintain. Encouraging energy efficiency, public transit use, building improvements, and other measures will also result in lower energy and water bills for residents and employers as well.

Acting now will also save on runaway costs on climate change, especially in the longer term. These costs range from infrastructure damage in extreme storms and pest control to industry losses, particularly for industries that depend on environmental conditions.

3. Enhancing Resource Security

A key strategic side benefit of climate change mitigation activities is enhanced energy security through reduction in total demand. This will put less strain on the energy system as a whole as we transition to clean renewable energy. Similarly, demand shifts can help with improving water and food security as well.

Many of the actions identified here to mitigate GHG emissions will also help Middletown Township's government operations, businesses, and residents to adapt to a changing climate. For example, extreme and prolonged heat waves can put considerable strain on the reliability of energy delivery in peak periods, possibly leading to service disruption during times when cooling is most needed. By increasing efficiency across the Township, such service disruptions are less likely and the Township will be able to better cope with those situations. Similarly, climate actions can secure food and water sources and prevent damage and service disruptions to these systems from major natural disasters such as flooding, fire, drought, and extreme heat or cold.

4. Creating Jobs

Renewable energy is a growing sector. The U.S. Department of Energy reports that sustainable tourism, green construction, and urban agriculture can provide job opportunities that didn't exist in the past. These climate protection measures can spur business and job growth during the design, manufacture, and installation of energy efficient technologies, which presents a particular opportunity to reinvest in the local economy and generate green jobs within Middletown Township.

5. Fostering Social Equity

Social equity and justice are major concerns for addressing climate change, and thus were established as core values behind this plan. Equity is when all individuals have access to the opportunities necessary to satisfy their essential needs, advance their well-being and achieve their full potential. Environmental justice ensures fair treatment and meaningful involvement in the development of laws, policies and regulations and the identification of issues impacting vulnerable communities. As discussed in Chapter 1, Middletown Township's community-driven planning process generated solutions that will both address climate change and ensure a better quality of life for communities of color, low-income families, and elderly individuals.

3. Middletown Township's GHG Emissions

Since the early 1990s, U.S. cities have developed community-wide and local government operations greenhouse gas (GHG) inventories based on accounting protocols created by ICLEI. Known as the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions and the Local Government Operations Protocol, these standards created a credible and defensible methodology which accelerated the number of inventories created and provides consistency within and across U.S. communities. In 2014, ICLEI partnered with the World Resources Institute and C40 Climate Leadership Group to create the Global Protocol for Community Scale GHG Emissions, which allows communities around the world to compare their emissions footprint.

Middletown Township used the ICLEI Local Governments for Sustaiability USA Clear Path Community-Scale Track for the inventory.

Through the completion of a local emissions study, or "greenhouse gas inventory," Middletown Township has determined emissions levels for the community as a whole. Community-wide emissions represent the sum total of emissions produced within Middletown Township limits as well as emissions resulting from electricity use within the jurisdiction, even if said electricity is generated elsewhere. In this way, the community-wide figures represent all emissions for which the community is responsible.

Middletown Township Community-Wide GHG Emissions

The following figure, Figure 2, breaks down community-wide emissions in Middletown Township for the year 2018. Note that emissions from Middletown Township's operations are embedded within the community-wide totals. For example, emissions from government buildings are included in the "Commercial" sector and emissions from Middletown Township fleet vehicles are included in the "Transportation" sector of the figure. Government operations are therefore a subset of total community emissions.

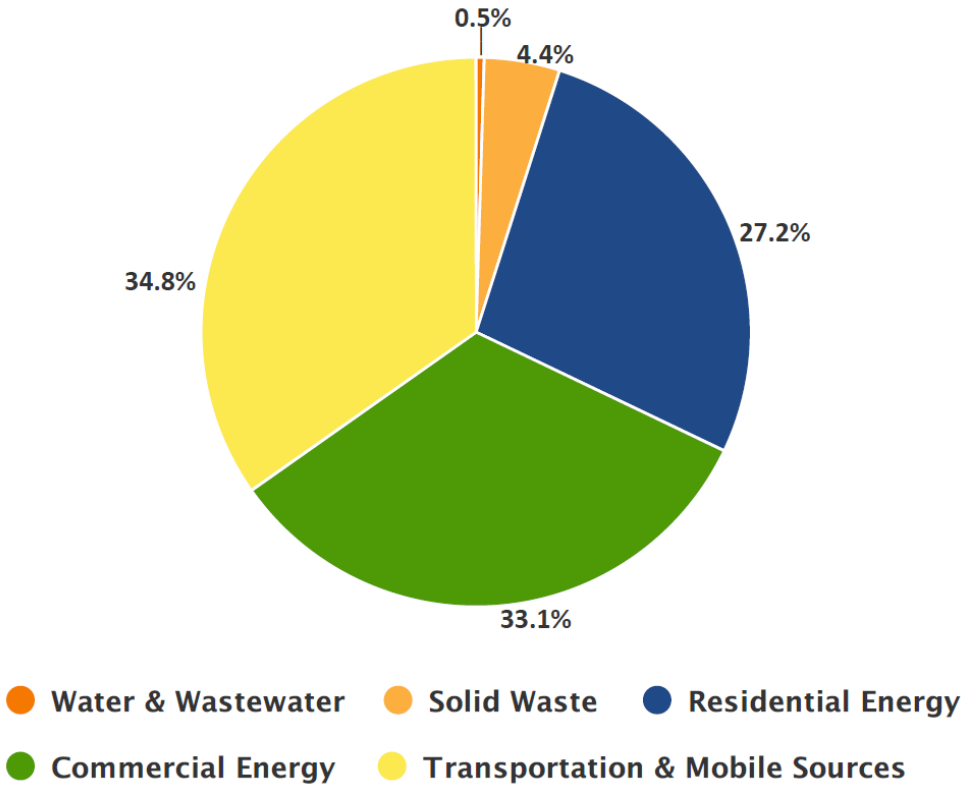


Figure 2: Middletown Township Community-Wide GHG Emissions by Sector, 2018

Government emissions include all sources for which the local government exercises direct operational control including public facilities, streetlights, traffic signals, and emergency and non-emergency vehicles, to name a few. Steps to reduce emissions produced by the Township have been underway for several years, including transition to LED lighting in public facilities, streetlights, and traffic signal lights.

Emissions in Middletown Township's GHG inventory include data from the following sources: Bucks County Water & Sewer Authority (BCWSA), Lower Bucks County Joint Municipal Authority (LBCJMA), Newtown Artesian Water Company (NAWC), Advanced Disposal, Republic Services of Philadelphia, Waste Management, Southeastern Pennsylvania Transportation Authority (SEPTA), Delaware Valley Regional Planning Commission (DVRPC), PECO, CSX and Norfolk Southern.

Forecasting Middletown Township's GHG Emissions

Middletown Township has also completed an emissions forecast based on projections of current data and expected future trends. This emissions forecast is the "Original" forecast (also known as a "Business as Usual" forecast), a scenario estimating future emissions levels if no further local action (i.e. projects within this Climate Action Plan) were to take place. The forecast indicates that, if we do not take action, GHG emissions will remain elevated.

Projected Growth in GHG Emissions

Figure 3 shows the projected growth in GHG emissions in Middletown Township from 2018 to 2050. For complete information regarding the emissions inventory and forecast, including methodology and supporting data, please reference Appendix I.

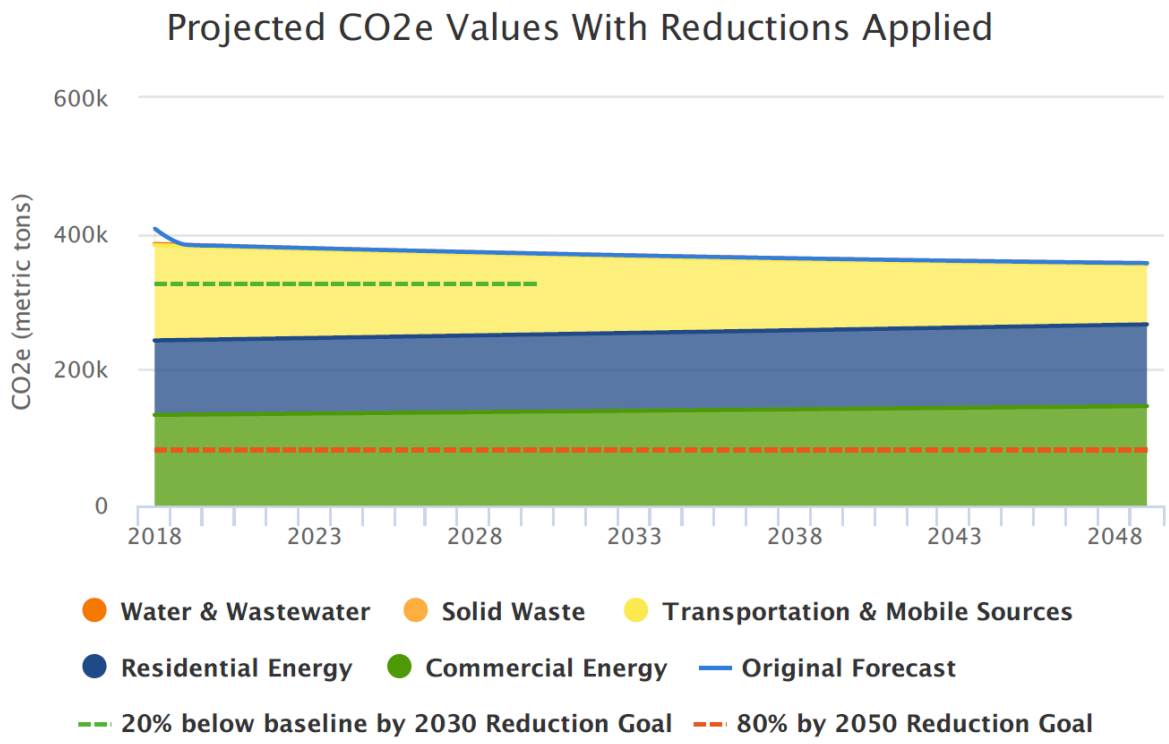


Figure 3: Projected Growth in GHG Emissions from 2018 to 2050 in Middletown Township.

Middletown Township's GHG Reduction Target

Middletown Township has set targets to reduce its emissions to 2018 levels by 2050, or 80 percent below 2018 levels by 2050. Figure 4 compares the reduction target with the business-as-usual forecast. The combination of measures that Middletown Township has already implemented and planned, and those that are presented through this Climate Action Plan are designed to achieve the 2050 targets. Reductions in 2050 rely on the best information currently available pertaining to population forecasts, future changes to building codes, and vehicle fuel efficiency standards among other information.

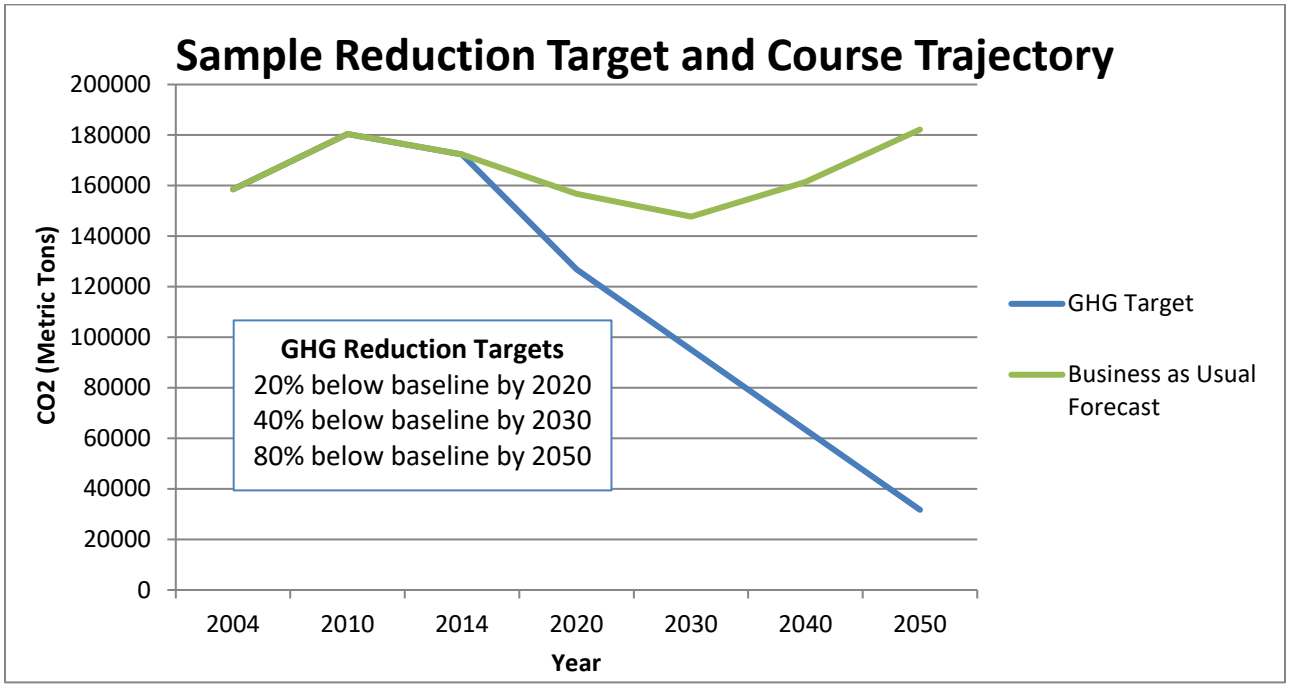


Figure 4: GHG Reduction Target

Middletown Township's reduction target is consistent with the statewide target of 26% reduction by 2025 and 80% by 2050 from 2005 levels, as it exceeds its local percentage of the total emissions reduction needed in order to achieve that target (see Appendix I for these calculations).

The Middletown Township Climate Action Plan

The following summary table identifies the sectors within the Middletown Township Climate Action Plan, the number of actions within each sector, and the contribution of each sector toward the GHG reduction goal. Each sector has a dedicated section within this document where objectives and specific actions (both new and those already employed) are described.

While the local government cannot address climate change by itself, government policies and practices can dramatically reduce greenhouse gas emissions from a range of sources and help prepare Middletown Township for the anticipated impacts of climate change. In addition, Middletown Township will assist residents and businesses in their endeavors to reduce emissions through programs explained in this Plan. By leading this effort with residents and businesses, Middletown Township will not only do its part toward achieving a stable climate, but the community will reap the benefits of healthier air, lower costs for utilities and services, improved transportation and accessibility, a more vibrant local economy, and many other co-benefits of reducing the community's carbon footprint.

Middletown Township Climate Action Plan Summary Table – Sectors

Sector	Description	Number of Distinct Actions	Anticipated MTCO2e Reduction by 2050	Percentage of Total Reduction at 2050
Commercial & Industrial Buildings	Policies and programs to reduce commercial, municipal, and industrial sector energy use.	9	~26,708	19.6%
Residential Buildings	Policies and programs to reduce residential sector energy use.	10	~21,923	16.1%
Energy Production	Policies and programs to promote local small-scale renewables.	9	~71,807	52.6%
Waste, Composting and Recycling	Policies and programs to reduce solid waste generation and expand renewable disposal alternatives.	11	~1,000	<1.0%
Water and Wastewater Management	Policies and programs to reduce water demands and corresponding wastewater treatment needs.	5	~1,000	<1.0%
Transportation	Policies and programs to reduce on-road vehicle miles traveled and promote electric or low emission vehicles.	19	~14,019	10.3%
Total		*63*	*~136,457*	*100%*

*MTCO2e (Metric tons of CO_2 equivalent)

The Impact on Emissions

The figure below depicts historic GHG emissions, forecasted growth in emissions, and target emissions from 2000 to 2020. The color wedges represent the projected reductions in emissions based on state and local programs.

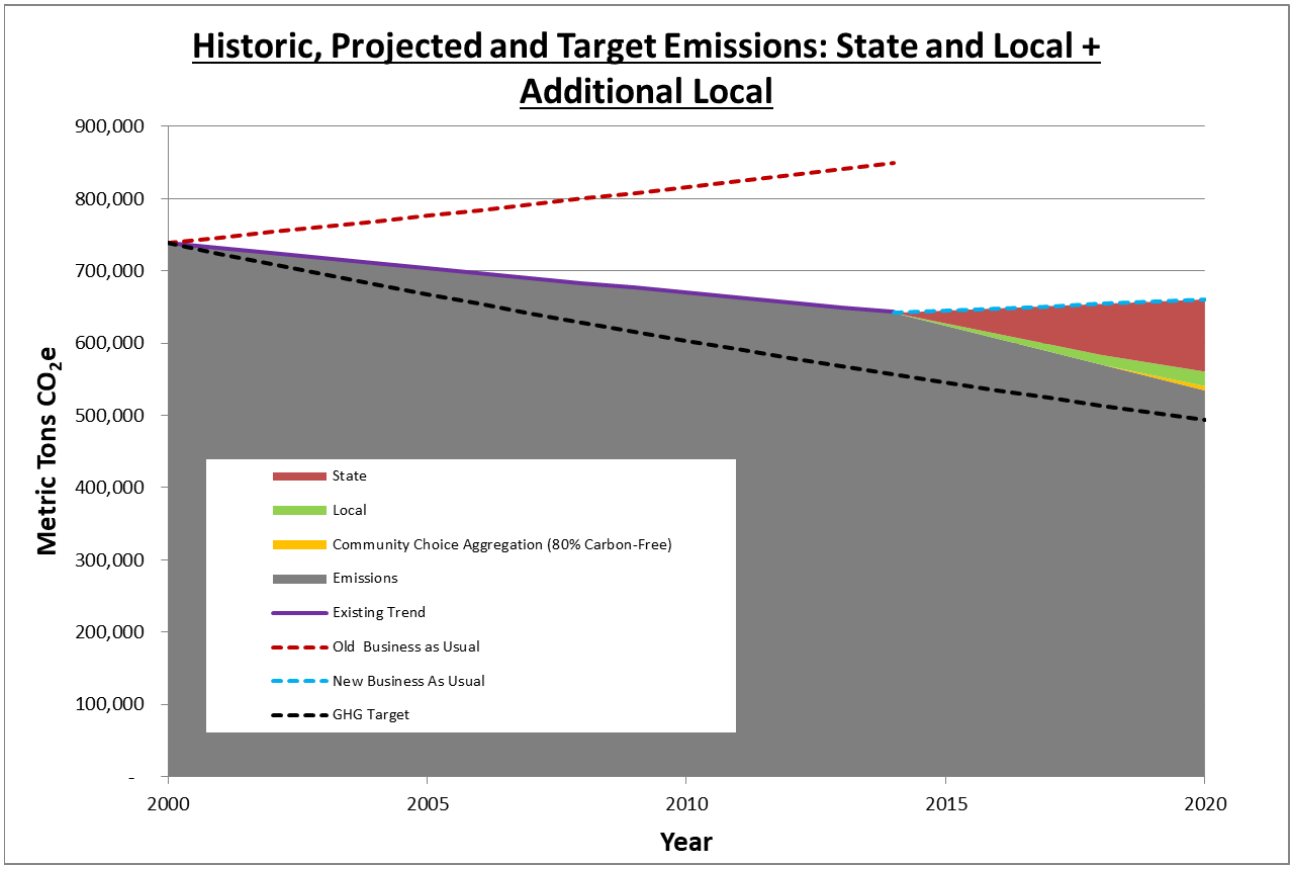


Figure 5: Visualizing GHG Reductions

3. Taking Action

In the following chapters, a series of objectives with supporting actions are explored for each emissions sector. An "Objective" is a goal, end result, or target, and an "Action" is a means of realizing the objective. Each sector draws on the actions of the local government, residents, and businesses, although some areas may be largely one or the other.

Emissions Reduction Potential

Calculating expected emissions reductions for each objective and action requires making assumptions about degree of implementation, technology, and individual behavioral changes several years into the future. The uncertainty associated with these assumptions makes it difficult to assign exact reduction totals to each objective or action. To address this uncertainty and provide a simple but useful reference for reduction potential, a series of symbols and percentage ranges has been devised to represent the emission reductions associated with each objective and its actions:

Symbol	Activity's Anticipated GHG Reduction
	Small Impact
	Moderate Impact
	Significant Impact

Specific implementation assumptions and GHG reduction estimates are listed in the Appendix.

Evaluating Co-Benefits

In addition to measuring the GHG reduction potential, each objective and action is also evaluated for other benefits such as public health, equity and justice, jobs and prosperity, and environmental conservation. The symbols below will indicate which co-benefits a measure will generate.

Symbol	Co-Benefit
	Supports jobs and economic prosperity
	Advances social equity
	Fosters resource security
	Improves public health and local environmental quality
	Reduces utility/operating costs

Supporting Actions

Certain actions might be supportive of more than one objective within the same or another sector. These cross-cutting actions will be indicated in the "Supporting Actions" column for each objective.

New and Existing Actions

This Climate Action Plan includes a combination of existing policies and programs as well as new ideas based on best practices from around the country. Whether an action is new or existing is noted in the action heading.

Consistency with Statewide Climate Action Plan

The Commonwealth of Pennsylvania's 2018 Climate Action Plan includes many actions that are meant to be implemented by local governments as well as on the state-level. This Climate Action Plan incorporates as many of those actions as possible and appropriate. The tables in the following chapters will indicate whether an action is adapted from the statewide plan.

Climate Adaptation

Some of the proposed actions reduce risk to climate hazards as well as greenhouse gas emissions, which is explicitly identified in the "Reduces Climate Risks" column. This Plan does not propose any actions that would foreseeably increase the community's risk to climate hazards, but some actions are more directly supportive of climate adaptation than others. The "Climate Adaptation" chapter describes climate hazards and related actions in more detail.

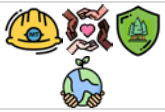
5. Commercial Buildings

Energy consumed in commercial buildings and industrial processes account for 33.1% of Middletown Township's total GHG emissions, as of 2018. Improving the efficiency of our commercial building stock and reducing the energy intensity of the local industrial sector will contribute significantly to achieving Middletown Township's greenhouse gas reduction target. This chapter focuses on opportunities to retrofit existing commercial and industrial buildings and to ensure that future activities in these sectors are compatible with our community's climate protection goals.

Objective	Supporting Actions	Co-Benefits	Reduction Potential
CB 1 – Retrofit existing commercial and industrial buildings to achieve an 80% reduction in energy use by 2050.	RB1; CB2; CB3; EP1; EP2; WW1		
CB 2 – Reduce carbon intensity of grid-supplied electricity by 2%per year through 2050.	CB1		
CB 3 – Ensure new commercial and industrial construction is built to maximize energy efficiency and use of renewable resources.	CB1		
CB 4 – Recognize businesses excelling in emission mitigation.	-		

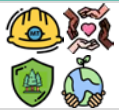
Objective CB 1 – Existing Commercial and Industrial Buildings

Retrofit existing commercial and industrial buildings to achieve an 80% reduction in energy use by 2050.


Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
CB-1A EXAMPLE	Partner with local utility companies to ensure commercial properties maximize use of energy efficiency rebate programs.	N	Y	Y		Administration; PECO	Number of partnerships
CB- 1B EXAMPLE	Require benchmarking and disclosure of energy use in commercial and industrial buildings over 10,000 square feet.	N	Y	Y		Board of Supervisors	Number of buildings using benchmarking
CB-1C EXAMPLE	Establish Commercial Property Assessed Clean Energy (C-PACE) program and/or partner with utilities to offer on-bill financing for commercial energy efficiency retrofit projects.	N	N	Y		Board of Supervisors; PECO; Tax Collector	Number of PACE projects
CB-1D EXAMPLE	Revise permit fee schedule to provide lower fees for sustainable projects.	N	N	Y		Building & Zoning Department; Board of Supervisors	Number of permits issued for sustainable projects

Objective CB 2 – Using Cleaner Energy

Reduce carbon intensity of grid-supplied electricity by 2%per year through 2050.


Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefit	Lead Actor	Metric
CB-2A EXAMPLE	Partner with energy supplier to source energy from sustainable, low- or no-emission sources.	N	N	Y		Administration; Board of Supervisors	Number of partnerships

Objective CB 3 – New Commercial and Industrial Buildings

Ensure new commercial and industrial construction is built to maximize energy efficiency and use of renewable resources.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
CB-3A EXAMPLE	Pass an alternative energy ordinance.	N	Y	N		Board of Supervisors	Enactment of ordinance
CB- 3B EXAMPLE	Require new commercial and industrial buildings to have at least 75% of their energy come from renewable sources.	N	N	Y		Board of Supervisors; PECO	Number of buildings using benchmarking
CB- 3C EXAMPLE	Incentivize new commercial and industrial buildings to be built with certification from a certified sustainability program.	N	N	Y		Board of Supervisors; Building & Zoning Department	Number of buildings using standard

Objective CB 4 – Recognizing Climate Excellence

Recognize businesses excelling in emission mitigation.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
CB-4A EXAMPLE	Develop a recognition program for businesses that celebrate those pursing efforts to reduce greenhouse gas emissions.	N	N	N		Board of Supervisors	Number of partnerships

6. Residential Buildings

Energy consumed in residential buildings accounts for 27.2% of Middletown Township's total GHG emissions. Improving the efficiency of our residential building stock will contribute significantly to achieving Middletown Township's greenhouse gas reduction target, while saving residents money on utility bills and reducing the need for new infrastructure. This chapter focuses on opportunities to retrofit existing residential buildings, increase the quality of new construction, and to ensure that future activities in these sectors are compatible with our community's climate protection goals.

Objective	Supporting Actions	Co-Benefits	Reduction Potential
RB 1 – Retrofit existing residential buildings and homes to achieve an 80% reduction in energy use by 2050.	CB1; RB2; EP1; WW1		
RB 2 – Ensure new residential buildings and homes are built to maximize energy efficiency.	RB1		
RB 3 – Improve awareness of greenhouse gas-generating activities at residential properties and identify mitigation strategies.	-		

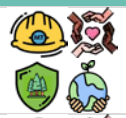
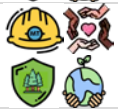
Objective RB 1 – Existing Residential Buildings

Retrofit existing residential buildings and homes to achieve an 80% reduction in energy use by 2050.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
RB-1A EXAMPLE	Double the number of homes weatherized through existing programs per year.	E	N	Y		Administration	Number of homes weatherized
RB-1B EXAMPLE	Increase residential uptake of utility incentives for energy efficiency.	E	N	Y		PECO	Number of residents participating
RB-1C EXAMPLE	Encourage replacement of inefficient appliances with newer models and methods by sharing information and exploring subsidy options.	E	N	Y		Administration; PECO	Reduction in energy consumption
RB-1D EXAMPLE	Establish a Residential Property Assessed Clean Energy (R-PACE) program and/or partner with utilities to offer on-bill financing for commercial energy efficiency retrofit projects.	N	N	Y		Building & Zoning Department; PECO; Tax Collector	Program participation
RB-1E EXAMPLE	Encourage replacement of insulation using sustainable, effective options.	E	N	Y		Administration; Building & Zoning Department	Number of homes with replaced insulation

Objective RB 2 – New Residential Buildings

Ensure new residential buildings and homes are built to maximize energy efficiency.


Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
RB-2A EXAMPLE	Improve building codes to exceed minimum efficiency requirements by 20%.	N	Y	Y		Building & Zoning Department	Number of new homes built with improved codes
RB-2B EXAMPLE	Pass an alternative energy ordinance.	E	N	Y		Board of Supervisors	Enactment of ordinance
RB- 2C EXAMPLE	Incentivize new residential buildings to be built with certification from a certified sustainability program.	N	N	Y		Board of Supervisors; Building & Zoning Department	Number of buildings using standard

Objective RB 3 – Awareness of Greenhouse Gas-Generating Activities

Improve awareness of greenhouse gas-generating activities at residential properties and identify mitigation strategies.


Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
RB-3A EXAMPLE	Develop a communication strategy and routinely communicate materials/information.	N	N	N		Administration	Development of strategy
RB-3B EXAMPLE	Develop an ongoing series of workshops to educate the community about increasing energy efficiency in their homes.	N	N	N		Environmental Advisory Council; Parks & Recreation	Development of series

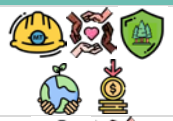
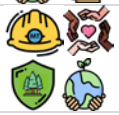
7.Energy Production

Broadly speaking, the use of fossil fuels for energy (including electricity, heating, transportation, and other uses) is the single largest contributor to greenhouse gas emissions and climate change. Fossil fuels still supply a considerable share of energy for electricity, heating, transportation, and other energy-producing uses. Emissions from fossil fuel combustion for energy, including transportation, represent 34.8% of the community's total GHG emissions. Energy Production is a cross-cutting sector in that nearly all activities that take place in the community require energy of some sort. While the Pennsylvania Electric Company (PECO) is working hard to increase the percentage of electricity generated through renewable sources, opportunities also exist for citizens and Middletown Township's local government to produce small-scale renewable energy or fuels, offsetting the need for fossil fuels. This sector is limited to energy production exclusively – objectives and actions that focus on end use energy efficiency are included in other sectors. The programs and projects within this sector are designed to spur local government and community investment in renewable energy sources including those that produce electricity, heat, and mobile fuels.

Objective	Supporting Actions	Co- Benefits	Reduction Potential
EP 1 – Enhance support to residents for installing small-scale renewable energy systems.	CB 1, RB 1		
EP 2 – Supply 100% of Middletown Township local government electricity demand via local renewable generation.	CB 1		
EP 3 – Empower large non-residential property-holders to implement energy production systems.	WR 1, WW 1		

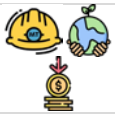
Objective EP 1 – Small-Scale Renewable Energy Systems

Enhance support to residents for installing small-scale renewable energy systems.


Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
EP-1A EXAMPLE	Encourage community partners to install renewable systems on small-scale private facilities	N	Y	Y		Administration	Number of systems installed
EP- 1B EXAMPLE	Establish a program to offer renewable energy system financing to small commercial properties	N	Y	N		Board of Supervisors; PECO	Program establishment
EP-1C EXAMPLE	Explore cooperative purchasing of solar panels and other systems to reduce the cost of acquiring renewable energy systems.	N	N	Y		Administration; Board of Supervisors	Research of cooperative purchasing and plan to implement

Objective EP 2 – Local Renewable Generation for Middletown Township

Supply 100% of Middletown Township local government electricity demand via local renewable generation.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
EP-2A EXAMPLE	Install renewable energy systems on Township-owned facilities such that 100% of total energy demand of local government buildings is met.	N	Y	Y		Public Works; PECO	Number of RE systems installed; percentage of energy demand met
EP-2B EXAMPLE	Replace appliances and amenities with energy efficient models and methods.	E	Y	Y		Public Works	Number of appliances/ amenities replaced
EP-2C EXAMPLE	Execute renewable power purchase agreement with PECO for 30% of total electricity demand of local government buildings	N	Y	Y		Board of Supervisors; PECO	Establishment of RE power purchase
EP-2D EXAMPLE	Consider geothermal heating/cooling and other innovative energy production methods at new Township facilities.	N	Y	N		Public Works	Research of innovative energy production methods

Objective EP 3 – Local Renewable Generation for Commercial Properties

Empower large non-residential property-holders to implement energy production systems.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
EP-3A EXAMPLE	Leverage information, potential tax advantages, rebate programs to spur energy production improvements to be made at major sites (i.e. Oxford Valley Mall, Sesame Place, schools, St. Mary's).	N	Y	N		Board of Supervisors; Administration	Uptake of programs
EP-3B EXAMPLE	Incentivize large parking lot owners to install solar power-generating parking covers.	N	Y	Y		Board of Supervisors	Number of systems installed

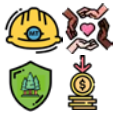
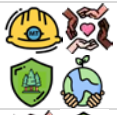
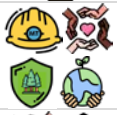
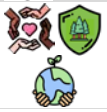
8. Waste, Composting, & Recycling

Middletown Township's solid waste is disposed of, primarily, at Wheelabrator Falls, a waste-to-energy facility **located in neighboring Falls Township**. Emissions from decaying putrescible material directly contribute 4.4% of Middletown Township's total GHG emissions and contribute to emissions in the Transportation sector via hauling of waste to and from facilities. Additionally, embodied energy within the items that we throw away might be harnessed through reuse and recycling of materials. It is in Middletown Township's long-term interest to reduce waste at its source, expand recycling facilities, reduce food waste, and enable re-use of materials. This chapter focuses on opportunities to reduce waste, reuse materials, and recycle what cannot be reused.

Objective	Supporting Actions	Co-Benefits	Reduction Potential
WR 1 – Reduce solid waste generation by 30% by 2050.	WR2		
WR 2 – Increase recycling community-wide by 50% by 2050.	WR1		

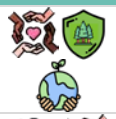
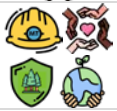
Objective WR 1 – Reduce Solid Waste

WR 1 – Reduce solid waste generation by 30% by 2050.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
WR-1A EXAMPLE	Encourage establishment of "Building Materials Reuse Warehouse" for community construction and demolition use that supports transition to sustainability programs.	N	N	N		Public Works Department	Establishment of program
WR-1B EXAMPLE	Partner with local grocers and retail business to implement alternatives to single-use plastic bags.	N	Y	Y		Board of Supervisors; Administration	Number of partnerships
WR-1C EXAMPLE	Implement uniform trash container size to limit excessive trash generation.	N	N	Y		Solid Waste Contractor; Board of Supervisors	Policy change; reduction of solid waste tonnage
WR-1D EXAMPLE	Evaluate solid waste management program and implement changes aimed at reducing trash generation.	N	N	Y		Solid Waste Contractor; Board of Supervisors	Reduction of solid waste tonnage
WR–1E EXAMPLE	Implement a composting program to divert organic materials from solid waste stream.	N	Y	Y		Public Works Department; Administration	Establishment of program
WR-1F EXAMPLE	Partner with local food industry partners to repurpose unsold, consumable food items.	N	N	N		Administration	Number of partnerships

Objective WR 2 – Increase Recycling

WR 2 – Increase recycling by 50% by 2050.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
WR-2A EXAMPLE	Establish a long-term public information strategy to identify and communicate best practices in residential recycling.	N	N	N		Administration; Solid Waste Contractor	Establishment of strategy
WR-2B EXAMPLE	Evaluate recycling management program and implement changes aimed at increasing recycling generation.	E	N	Y		Administration; Solid Waste Contractor	Establishment of program
WR-2C EXAMPLE	Expand recycling opportunities at multi-family residential developments, including apartment complexes and townhome communities.	N	Y	Y		Administration; Parks & Recreation Department; EAC	Increased recycling tonnage
WR-2D EXAMPLE	Increase the number of items for the Township made partially or completely of recycled materials.	N	N	Y		Administration	Number of recycled goods procured
WR-2E EXAMPLE	Deploy recycling containers at Township parks to prevent littering and to divert recyclables from solid waste stream.	E	N	Y		Parks & Recreation Department	Number of recycling containers deployed

9. Water & Wastewater Management

Middletown Township does not own and operate its own water and wastewater delivery and treatment facilities. The Township is serviced by three companies: Bucks County Water & Sewer Authority (BCWSA), Lower Bucks County Joint Municipal Authority (LBCJMA), and Newtown Artesian Water Company (NAWC). Emissions from water and wastewater treatment and distribution contribute to 0.5% of Middletown Township's total GHG emissions, the smallest factor measured in this assessment.

A unique challenge Middletown Township has at reducing GHG emissions related to water and wastewater is that the most of the oversight of these utilities is charged to the authorities themselves. In this circumstance, it is critical that Middletown Township partner with its water and wastewater utilities to implement system efficiencies and education plans as they cannot be achieved unilaterally.

Objective	Supporting Actions	Co-Benefits	Reduction Potential
WW 1 – Upgrade the energy efficiency of water delivery and treatment systems by 15% by 2040.	CB 1, RB 1; WW2		
WW 2 – Improve public awareness of water usage and encourage the community to use more sustainable practices.	WW1		

Objective WW 1 – Energy Efficiency

Upgrade the energy efficiency of water delivery and treatment systems by 15% by 2040.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
WW-1A EXAMPLE	Upgrade the mechanical and electrical systems at water/wastewater treatment facilities.	N	Y	Y		Water/wastewater utilities	Number of systems upgraded
WW-1B EXAMPLE	Participate in utilities' energy efficiency incentive programs to upgrade infrastructure efficiency.	N	N	Y		Water/wastewater utilities	Program participation

Objective WW 2 – Public Awareness

Improve public awareness of water usage and encourage the community to use more sustainable practices.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
WW-2A EXAMPLE	Encourage implementation of technology for smartphone monitoring of water usage.	N	N	Y		Water/wastewater utilities; Administration	Number of platform participants
WW-2B EXAMPLE	Encourage water/wastewater utilities to implement rebate and incentive programs to encourage sustainable habits.	N	N	Y		Administration	Implementation of program
WW-2C EXAMPLE	Provide low- or no-cost opportunities for residents to retrofit water fixtures and appliances with more efficient models.	N	N	Y		Water/wastewater utilities; Administration	Number of retrofits

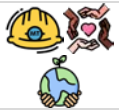
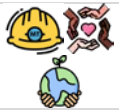
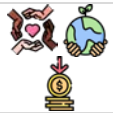
10. Transportation

Emissions from transportation is a common sight to nearly everyone in Middletown Township. Besides emitting greenhouse gases, transportation fossil fuels also produce a host of criteria air pollutants when combusted, reducing local air quality and affecting our health. Transportation accounts for 34.8% of Middletown Township's total GHG emissions, the single-largest contributor to GHGs in our community. This chapter focuses on programs and policies to reduce emissions from transportation and includes design-oriented approaches as well as expansion of alternate modes such as walking, biking, or public transportation to and from the most common destinations in Middletown Township.

Objective	Supporting Actions	Co- Benefits	Reduction Potential
TR 1 – Reduce vehicle miles traveled by single-occupancy vehicles by 30% by 2050.	TR2; TR3		
TR 2 – Electrify nearly all of municipal fleet by 2050 & adopt sustainable transportation infrastructure maintenance practices.	TR1; TR3		
TR 3 – Improve access to electric vehicle infrastructure.	TR2; TR3		

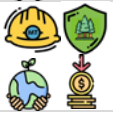
Objective TR 1 – Reduce single-occupancy vehicle miles traveled

Reduce vehicle miles traveled by single-occupancy vehicles by 30% by 2050.


Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
TR-1A EXAMPLE	Develop and adopt a transportation demand management (TDM) policy to educate the community about alternative means of transportation.	N	Y	Y		Board of Supervisors; TMA Bucks	Development of policy
TR-1B EXAMPLE	Partner with the Pennsylvania Department of Transportation (PennDOT) to expand the local bike lane network and to make roadways safer for bicyclists.	E	Y	N		Public Works Department; PennDOT	Number of bike lane miles added
TR-1C EXAMPLE	Improve sidewalk connectivity between residential and commercial developments.	E	Y	Y		Public Works Department	Number of sidewalk miles added
TR-1D EXAMPLE	Add shelter facilities and sidewalk connectivity for all public transportation access points.	E	N	N		Public Works Department; SEPTA	Number of shelters and pedestrian connections made
TR-1E EXAMPLE	Encourage SEPTA to monitor and adjust/add us routes in the community.	N	N	Y		Administration; SEPTA	Increased ridership
TR-1F EXAMPLE	Incorporate designated carpool parking requirements into the development code.	N	Y	Y		Board of Supervisors	Number of developments built with new code
TR-1G EXAMPLE	Improve distribution of public transportation schedules for employees of Township businesses.	N	N	N		Administration; SEPTA	Increased ridership
TR-1H EXAMPLE	Make SEPTA Key Cards available for purchase at the Municipal Center.	E	N	N		Administration; SEPTA; TMA Bucks	Number of SEPTA Key Cards purchased

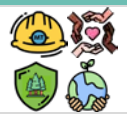
Objective TR 2 – Electrify Township vehicles

Electrify nearly all of municipal fleet by 2050 & adopt sustainable transportation infrastructure maintenance practices.

Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
TR-2A EXAMPLE	Make 100% of non-emergency vehicles electric by 2040.	N	N	Y		Board of Supervisors; Administration	Number of vehicles purchased; reduced consumption of gasoline
TR-2B EXAMPLE	Make 100% of Police vehicles electric by 2050.	N	N	Y		Board of Supervisors; Police Department	Number of vehicles purchased; reduced consumption of gasoline
TR-2C EXAMPLE	Make 50% of Public Works vehicles electric by 2050.	N	N	Y		Board of Supervisors; Public Works Department	Number of vehicles purchased; reduced consumption of gasoline
TR-2D EXAMPLE	Expand infrastructure to support transition to all-electric vehicles, including charging stations and back-up energy sources.	N	N	N		Public Works Department; Police Department	Capacity of backup energy available
TR-2E EXAMPLE	Explore alternatives to salt-based snow and ice remediation tools.	N	N	Y		Public Works Department	Implementation of alternatives

Objective TR 3 – Making electric vehicles attainable

Improve access to electric vehicle infrastructure.


Action Number	Action	New (N) or Existing (E)	Statewide CAP Action	Reduces Climate Risk	Co-Benefits	Lead Actor	Metric
TR-3A EXAMPLE	Add electric vehicle charging stations at all Township-owned facilities and properties.	E	Y	Y		Board of Supervisors; Public Works Department	Number of plugs added
TR-3B EXAMPLE	Add level 3 (fast-charging) electric vehicle charging stations along key transportation corridors to reduce emissions created by non-residents.	N	N	Y		Board of Supervisors; Public Works Department	Number of plugs added
TR-3C EXAMPLE	Partner with existing shopping centers and retailers to add electric vehicle charging stations for patrons.	N	Y	Y		Administration; EAC	Number of plugs added
TR-3D EXAMPLE	Partner with multi-family residential developments and townhome/condominium developments to expand presence of electric vehicle charging stations.	N	Y	Y		Board of Supervisors; Public Works Department	Number of plugs added
TR-3E EXAMPLE	Amend zoning ordinance to require electric vehicle charging stations in new commercial land developments.	N	N	Y		Board of Supervisors	Enactment of ordinance
TR-3F EXAMPLE	Require new residential developments to be built to accommodate electric vehicle charging in garage and driveway areas.	N	N	N		Board of Supervisors	Enactment of ordinance

11. Climate Adaptation

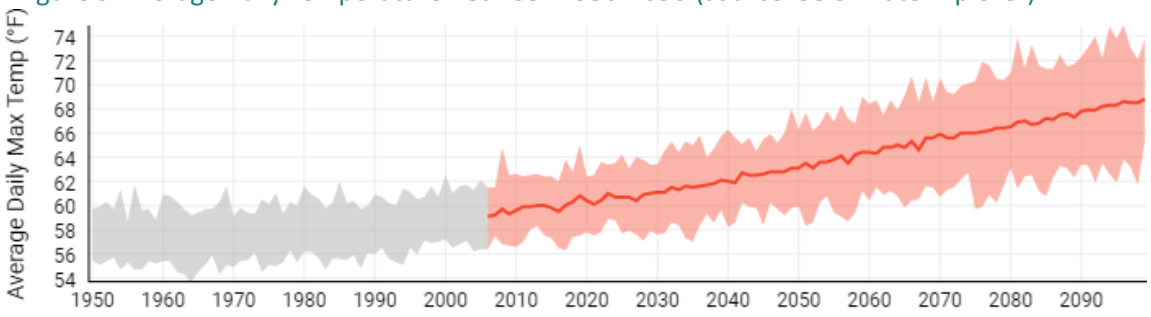
This section provides a high-level assessment of potential climate impacts and highlights those greenhouse gas reduction actions that support adaptation for each type of hazard. While Middletown Township does not currently have the capacity to complete a more robust climate vulnerability assessment and adaptation action, the following analysis was completed to educate the public on local impacts and inform future efforts.

Anticipated Climate Impacts

Over the last 110 years, the Commonwealth of Pennsylvania has experienced a long-term warming of more than 1.8°F, as well as an increasing number of wet months. The warming and wetting trend is expected to continue at an accelerated rate, especially if the world continues on its current path of greenhouse gas emissions. Under this scenario, Pennsylvania will be about 5.9°F warmer than it was at the end of the 20th century, and the annual precipitation will increase about 8%. While the likelihood of meteorological drought is projected to decrease, months with above-average precipitation will continue to rise. These changes will have a variety of ecological, economic, and social impacts on the Commonwealth, particularly related to agriculture, energy, forests, human health, outdoor recreation, water, wetlands and aquatic ecosystems, and coastal resources (Shortle et al. 2015).

Middletown Township has and is likely to continue experiencing climate impacts such as increased average temperature, worsening air quality, flooding, and weather volatility. As one example, the following graph indicates that average daily temperatures have been increasing and will continue to rise through the year 2090, which could impact agriculture, public health, and other sectors of the community.

Figure 5: Average Daily Temperature Between 1950-2090 (source: US Climate Explorer)



Adaptive Greenhouse Gas Reduction Measures

Some greenhouse gas reduction measures also reduce risk to climate hazards. The following are a few of many examples of how these outcomes can be related to one another:

Actions that improve energy efficiency and distribute renewable energy can (1) reduce pressure on the grid when there is higher energy demand for heating and air conditioning during extreme heat events, and (2) increase energy independence for households and businesses, as opposed to complete reliance on centralized power infrastructure that could fail during a catastrophic event. These types of actions include, but are not limited to:

  - Energy-efficient building design for new construction, and retrofits for existing buildings (e.g. weatherization)
  - Onsite combined heat and power (CHP)
  - Smart grid technologies
  - Microgrids
- Actions that reduce impervious surfaces can reduce the potential for flooding by retaining stormwater in place. These types of actions include, but are not limited to:
  - Expanding or restoring green space
  - Installing green roofs, rain gardens, bioswales, pervious pavers, and other green infrastructure (as well as requiring them for future development)
- Installing green roofs and planting trees adjacent to buildings can regulate indoor temperatures during extreme heat events
- Expanding and protecting alternative transportation routes (bicycle, pedestrian, bus, and rail) provides network redundancies and alternative routes for emergency evacuation
- Water efficiency and conservation actions can (1) reduce pressure on the grid from energy used for pumping, treating, and distributing water, and (2) make the community less vulnerable to drought

The following table identifies specific greenhouse gas reduction actions from the previous chapters that have the potential to reduce risk from climate hazards, and which hazards they address.

Action Number	Action	Increased Average Temperatures	Worsening Air Quality	Flooding	Weather Volatility
CB-2A EXAMPLE	Partner with PECO to source energy from sustainable, low- or no-emission sources.	X	X		
RB-1A EXAMPLE	Double the number of homes weatherized through existing programs per year	X		X	X
EP- 2D EXAMPLE	Consider geothermal heating/cooling and other innovative energy production methods at new Township facilities.	X	X		X
WR - 1B EXAMPLE	Partner with local grocers and retail business to implement alternatives to single-use plastic bags.	X	X	X	X
WW-1A EXAMPLE	Upgrade the mechanical and electrical systems at water/wastewater treatment facilities.	X	X	X	
TR-1A EXAMPLE	Develop and adopt a transportation demand management (TDM) policy to educate the community about alternative means of transportation.	X	X		X

12. Monitoring Plan

Establishing a monitoring process enables Middletown Township to track the impacts of the actions included in the plan and compare estimated impacts to what is actually achieved in terms of energy savings, renewable energy production, and GHG emissions reduction. Assessing the implementation status of the actions will allow determination of whether the action is performing well and to identify corrective measures. This process is also an opportunity to understand barriers to implementation and identify best practices or new opportunities in moving forward.

The table below describes the components of the monitoring reports. Action reports are to occur every two (2) years and will only include status updates on the overall action, the mitigation action plan, and the adaptation action plan. The full monitoring report will occur every five (5) years and in addition to the components in the action report, will include an updated community and municipal GHG inventory. This will help Middletown Township track its GHG emissions reduction progress. With the approval of this Climate Action Plan in 2021, the first monitoring action report will be due in 2023 and the first full monitoring report with the updated GHG inventories will be due in 2026. Ideally, the most recent GHG inventories should be no more than four years old.

Monitoring Report Component	Action Reporting	Full Reporting
Overall Action: Reporting any changes to initial action as well as updated information on human and financial resources	Yes	Yes
GHG Emissions Inventories: Provide updated energy consumption and GHG emissions data for the reporting year	No	Yes
Climate Action Measures: Report the implementation status (completed, in progress, on hold) of key actions and update their impacts	Yes	Yes

Starting in 2022, Middletown Township will engage with community members, businesses, institutions, and other stakeholders to prepare for any prerequisite or additional actions needed to begin Plan implementation. This effort will be led by the Township Administration, Parks and Recreation Department, and the Environmental Advisory Council (EAC).

Some of these prerequisite actions include:

- Establishing programs that require considerable conceptual development and community engagement.
- Gathering bids for contracted services and equipment.
- Making necessary changes to local policies or existing programs, including staffing.

13. References

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Shortle, James, David Abler, Seth Blumsack, Aliana Britson, Kuai Fang, Armen Kemanian, Paul Knight, Marc McDill, Raymond Najjar, Michael Nassry, Richard Ready, Andrew Ross, Matthew Rydzik, Chaopeng Shen, Shilong Wang, Denice Wardrop, Susan Yetter. 2015. Pennsylvania Climate Impacts Assessment Update. Pennsylvania State University. Retrieved from Pennsylvania Department of Environmental Protection: http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=5002&DocName=2015%20PENNSYLVANIA%20CLIMATE%20IMPACTS%20ASSESSMENT%20UPDATE.PDF%20

14. Glossary

Absorb- To enter a body. For example, radiation from the sun is absorbed by the surface of the earth, water or the atmosphere.

Adaptation- The adjustment in natural or human systems to a new or changing environment.

Bucks County Water & Sewer Authority (BCWSA)- One of three water and wastewater agencies providing service to residents and businesses of Middletown Township, existing as a separate unit of government created by more than one municipal government to handle a special purpose.

Building Codes- A set of rules that specify the standards for constructed objects such as buildings and nonbuilding structures.

Carpooling- The sharing of car journeys so that more than one person travels in a car, and prevents the need for others to have to drive to a location themselves.

Climate- A region's long-term, average weather elements such as temperature and precipitation. The climate generally determines what kind of plants will grow in that region.

Climate Action Plan- A comprehensive, evidence-based plan that outlines measures to reduce greenhouse gas emissions and preventative measures to address the negative outcomes of climate change.

Climate Change- A significant and long-term change in the weather patterns over periods ranging from decades to thousands of years. The change may range over a specific region or the entire Earth.

Combustion- The process where a substance reacts with oxygen and gives off heat and light.

Commercial- Property and activities that are used for business or corporate activities.

Composting- The process of combining organic waste materials with soil through the controlled aerobic, biological decomposition of biodegradable materials.

Department of Environmental Protection (DEP)- The agency in the Commonwealth of Pennsylvania responsible for protecting and preserving the land, air, water, and public health through enforcement of the state's environmental laws.

Delaware Valley Region Planning Commission (DVRPC)- The metropolitan planning organization for the Delaware Valley, serving nine counties in Southeastern Pennsylvania and New Jersey, created in 1965 by an interstate compact, responsible for transportation and regional planning.

Electric Vehicle- A motor vehicle powered by an electric motor instead of an internal combustion engine.

Emissions- Something that has been emitted, such as heat, liquid, sound, light, and gas.

Energy Efficiency- The process of using less energy to complete the same job, task, or function.

Environmental Protection Agency (EPA)- An independent executive agency of the United States federal government tasked with environmental protection matters.

Equity- In the context of climate, it both protects all people equally from environmental hazards and provides equal access to environmental benefits.

Fossil Fuel- Carbon-rich deposits comprised of decomposing plants and other organisms buried beneath layers of sediment and rock, processed into consumable fuel; which typically generate a significant amount of greenhouse gasses.

Greenhouse Gas (GHG)- A gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect, whereby heat is absorbed and re-radiated by greenhouse gasses.

Greenhouse Gas Inventory (GHGI)- A list of emission sources and the associated emissions quantified using standardized methods, which can be performed cyclically to monitor change in greenhouse gas quantities.

Land Use- The human modification and management of land, such as residential, commercial, industrial, and agricultural.

Lower Bucks County Joint Municipal Authority (LBCJMA)- One of three water and wastewater agencies providing service to residents and businesses of Middletown Township, existing as a separate unit of government created by more than one municipal government to handle a special purpose.

Mitigation- The act of reducing the severity of something.

Ordinance- A piece of legislation enacted by a municipal government or authority.

Pennsylvania Electric Company (PECO)- The electricity and gas utility company providing service to residents and businesses of Middletown Township, a regional subsidiary of a publicly-traded company.

Precipitation- Any and all forms of water, liquid or solid, that falls from clouds and reaches the ground. This includes drizzle, freezing drizzle, freezing rain, hail, ice crystals, ice pellets, rain, snow, snow pellets, and snow grains. The amount of fall is usually expressed in inches of liquid water depth of the substance that has fallen at a given point over a specified time period.

Property Assess Clean Energy (PACE) Programs- A financing mechanism used for commercial (C-PACE) and residential (R-PACE) properties whereby a loan is repaid by the property owner over an extended period of time, allowing for the operational savings from a clean energy system to be rolled into incrementally paying off the loan for the capital investment for a clean energy system.

Recycling- The process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products.

Residential- Property that is used as a living space or dwelling for one or more individuals or households.

Newtown Artesian Water Company (NAWC)- One of three water and wastewater agencies providing service to residents and businesses of Middletown Township, existing as a privately-owned agency.

Southeastern Pennsylvania Transportation Authority (SEPTA)- A regional public transportation authority that operates bus, rapid transit, commuter rail, light rail, and electric trolleybus services for nearly four million people in five counties in and around Philadelphia, Pennsylvania.

Solar Energy- Energy from the sun that is converted into thermal or electrical energy, often regarded as the cleanest and most abundant renewable energy resource.

Solid Waste- A term referring to all trash or garbage items discarded by the public that are not otherwise diverted into a regenerative process such as recycling or composting.

Sustainable- The ability to endure a relatively ongoing way across various domains of life.

Tax Incentive- A government measure that is intended to encourage individuals and businesses to spend money or to save money by reducing the amount of tax that they have to pay.

Transportation Management Association (TMA)- A typically county-wide organization that provides leadership and advocacy for transportation management services and solutions that impact its region.

Utility- An organization that maintains the infrastructure for a public service, often subject to forms of public control and regulation at multiple levels of government.

Walkability- A measure of how friendly an area is for walking.

Wastewater- Used water produced by residential and commercial properties, often containing human and chemical waste.

Weather- The state of the atmosphere at a given location and time. It includes such variables as temperature, precipitation, cloudiness, wind speed and direction, and relative humidity.

Weatherization- The practice of protecting a building and its interior from the elements, particularly from sunlight, precipitation, and wind, and of modifying a building to reduce energy consumption and optimize energy efficiency.

Zoning- A method of urban planning in which a municipality or other tier of government divides land into areas called zones, each of which has a set of regulars for new development that differs from other zones.

Appendix I: Methodology

Energy

The following table shows each activity related to energy consumption, data source, and notes on data gaps.

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Residential, commercial, and industrial electricity consumption	PECO & DVRPC	*
Residential, commercial, and industrial natural gas consumption	PECO & DVRPC	*
Residential fuel oil and propane	DVRPC	*
Local Government Operations		
Electricity consumption	PECO	*
Natural gas consumption	PECO	*

* From DVRPC presentation, 10-16-2020, Slide 11.

Stationary Energy Use Methods—Direct fuel consumption for natural gas and electricity from utilities, mostly at the municipal level

- Residential, commercial, or industrial
- For data provided at the Zip code level, allocated proportionally to municipalities based on 2010 census block populations.

Transportation

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Vehicle miles travelled	DVRPC	N/A
Transit ridership	SEPTA	Data restored following malware attack.
Local Government Operations		
Government vehicle fleet	Middletown Township	N/A

Wastewater

Activity	Data Source	Data Gaps/Assumptions
Communitywide & Local Government Operations		
Nitrogen Discharge	LBCJMA, BCWSA, NAWC	Treatment of wastewater handled by external facilities for some local water authorities.
Digester Gas Combustion/Flaring		

Potable Water

Activity	Data Source	Data Gaps/Assumptions
Communitywide		
Water Supply	Lower Bucks County Joint Municipal Authority	Total customers served: 64,556 Middletown customers: approx. 18,217
Water Supply	Bucks County Water & Sewer Authority	Total customers served: 38,500 Middletown customers: approx. 6,200
Water Supply	Newtown Artesian Water Company	Total customers served: 100,000 Middletown customers: approx. 20,583

Solid Waste

Activity	Data Source	Data Gaps/Assumptions
SW Collection- General Residential	Waste Management	Approx. 12,250 homes (90% of all single-family homes) serviced by Township contract. Concern about possible importation of trash from outside communities.
SW Collection- HOA Residential	Waste Management, Advanced Disposal, Republic Services, Projections	Vendors and collections chosen by Homeowners' Associations.
SW Collection- Multi-Family Residential	Waste Management, Advanced Disposal, Republic Services, Projections	Approx. 3,700 apartment units; vendors and collections chosen by complexes.
SW Collection- Commercial Collection	Waste Management, Advanced Disposal, Republic Services, Projections	Vendors and collections chosen by individual businesses.

Inventory Calculations

The 2018 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the IPCC 5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO_2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO_2e emissions.

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- About ICLEI
- Government Track
- Community-Scale Track
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- Inventories
- Forecasts
- Planning
- Monitoring
- Factor Sets
- Reports

Jurisdiction: Middletown, PA

- Middletown, PA
-

GPC Overview

Export of outputs in the format of GPC Table 4.3

Year	Population	GDP	Currency	Global Warming Potential	GPC Reference Number	Scope	GHG Emissions Source (By Sector and Subsector)	Notation Keys	CO2	CH4	N2O	HFC	PFC	SF6	NF3	Total CO2e	CO2(b)	Activity Data Quality	Emission Factors Quality	Comments
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I		STATIONARY ENERGY													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.1		Residential buildings													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.1.1	1	Emissions from fuel combustion within the city boundary		66208.12	8.49	0.47					66569.26				
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.1.2	2	Emissions from grid-supplied energy consumed within the city boundary		42815.18	3.65	0.48					43044.10				
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.1.3	3	Transmission and distribution losses from grid-supplied energy													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.2		Commercial and institutional buildings and facilities													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.2.1	1	Emissions from fuel combustion within the city boundary		61409.54	7.72	0.41					61733.95				
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.2.2	2	Emissions from grid-supplied energy consumed within the city boundary		71425.45	6.09	0.80					71807.34				Commercial and Industrial energy data is combined. Thank you
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.2.3	3	Transmission and distribution losses from grid-supplied energy													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.3		Manufacturing industries and construction													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.3.1	1	Emissions from fuel combustion within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.3.2	2	Emissions from grid-supplied energy consumed within the city boundary		508.13	0.04	0.01					510.85				

Year	Population	GDP	Currency	Global Warming Potential	GPC Reference Number	Scope	GHG Emissions Source (By Sector and Subsector)	Notation Keys	CO2	CH4	N2O	HFC	PFC	SF6	NF3	Total CO2e	CO2(b)	Activity Data Quality	Emission Factors Quality	Comments
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.3.3	3	Transmission and distribution losses from grid-supplied energy													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.4		Energy industries													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.4.1	1	Emissions from energy production used in power plant auxiliary operations within the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.4.2	2	Emissions from grid-supplied energy consumed by energy industries													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.4.3	3	Emissions from transmission and distribution losses from grid-supplied energy used in power plant auxiliary operations													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.4.4	1	Emissions from energy generation supplied to the grid													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.5		Agriculture, forestry and fishing activities													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.5.1	1	Emissions from fuel combustion within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.5.2	2	Emissions from grid-supplied energy consumed within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.5.3	3	Transmission and distribution losses from grid-supplied energy													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.6		Non-specified sources													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.6.1	1	Emissions from fuel combustion within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.6.2	2	Emissions from grid-supplied energy consumed within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.6.3	3	Transmission and distribution losses from grid-supplied energy													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.7		Fugitive emissions from mining, processing, store, and transportation of coal													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.7.1	1	Fugitive emissions from mining, processing, storage, and transportation of coal within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.8		Fugitive Emissions from iol and natural gas systems													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	I.8.1	1	Fugitive emissions from oil and natural gas systems within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II		TRANSPORTATION													

Year	Population	GDP	Currency	Global Warming Potential	GPC Reference Number	Scope	GHG Emissions Source (By Sector and Subsector)	Notation Keys	CO2	CH4	N2O	HFC	PFC	SF6	NF3	Total CO2e	CO2(b)	Activity Data Quality	Emission Factors Quality	Comments
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.1		On-road transportation													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.1.1	1	Emissions from fuel combustion on-road transportation occurring in the city		139363.03							139363.03				
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.1.2	2	Emissions from grid-supplied energy consumed in the city for on-road transportation													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.1.3	3	Emissions from transboundary journeys occurring outside the city, and T and D losses from grid-supplied energy use													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.2		Railways													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.2.1	1	Emissions from fuel combustion for railway transportation occurring in the city		41.93							42.31				
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.2.2	2	Emissions from grid-supplied energy consumed in the city for railways		774.54	0.07	0.01					778.68				
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.2.3	3	Emissions from transboundary journeys occurring outside the city, and T and D losses from grid-supplied energy use													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.3		Waterborne navigation													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.3.1	1	Emissions from fuel combustion for waterborne navigation occurring in the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.3.2	2	Emissions from grid-supplied energy consumed in the city for waterborne navigation													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.3.3	3	Emissions from transboundary journeys occurring outside the city, and T and D losses from grid-supplied energy use													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.4		Aviation													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.4.1	1	Emissions from fuel combustion for aviation occurring in the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.4.2	2	Emissions from grid-supplied energy consumed in the city for aviation													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.4.3	3	Emissions from transboundary journeys occurring outside the city, and T and D losses from grid-supplied energy use													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.5		Off-road transporation													

Year	Population	GDP	Currency	Global Warming Potential	GPC Reference Number	Scope	GHG Emissions Source (By Sector and Subsector)	Notation Keys	CO2	CH4	N2O	HFC	PFC	SF6	NF3	Total CO2e	CO2(b)	Activity Data Quality	Emission Factors Quality	Comments
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.5.1	1	Emissions from fuel combustion for off-road transportation occurring in the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.5.2	2	Emissions from grid-supplied energy consumed in the city for off-road transportation													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	II.5.3	3	Emissions from transboundary journeys occurring outside the city, and T and D losses from grid-supplied energy use													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III		WASTE													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.1		Solid waste disposal													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.1.1	1	Emissions from solid waste generated in the city and disposed in landfills or open dumps within the city			241.74						6768.65				
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.1.2	3	Emissions from solid waste generated in the city but disposed in landfills or open dumps outside the city			228.30						6392.46				see attachment
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.1.3	1	Emissions from waste generated outside the city and disposed in landfills or open dumps within the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.2		Biological treatment of waste													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.2.1	1	Emissions from solid waste generated in the city that is treated biologically in the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.2.2	3	Emissions from solid waste generated in the city but treated biologically outside of the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.2.3	1	Emissions from waste generated outside the city boundary but treated in the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.3		Incineration and open burning													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.3.1	1	Emissions from waste generated and treated within the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.3.2	3	Emissions from waste generated within but treated outside of the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.3.3	1	Emissions from waste generated outside the city boundary but treated within the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.4		Wastewater treatment and discharge													
2018			USD - US Dollar	IPCC 5th Assessment	III.4.1	1	Emissions from wastewater generated													

Year	Population	GDP	Currency	Global Warming Potential	GPC Reference Number	Scope	GHG Emissions Source (By Sector and Subsector)	Notation Keys	CO2	CH4	N2O	HFC	PFC	SF6	NF3	Total CO2e	CO2(b)	Activity Data Quality	Emission Factors Quality	Comments
				100 Year Values			and treated within the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.4.2	3	Emissions from wastewater generated within but treated outside of the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	III.4.3	1	Emissions from wastewater generated outside the city boundary but treated within the city													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	IV		INDUSTRIAL PROCESSES and PRODUCT USES (IPPU)													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	IV.1	1	Emissions from industrial processes occuring in the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	IV.2	1	Emissions from product use occurring within the city boundary													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	V		AGRICULTURE, FORESTRY and OTHER LAND USE (AFOLU)													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	V.1	1	Emissions from livestock													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	V.2	1	Emissions from land													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	V.3	1	Emissions from aggregate sources and non-CO2 emission sources on land													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	VI		OTHER SCOPE 3													
2018			USD - US Dollar	IPCC 5th Assessment 100 Year Values	VI.1	3	Other Scope 3		5880.17	4.52	0.59					6163.64	7982.33			see attachment; see attachment

Statewide Energy Efficiency Collaborative

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- Home
- About ICLEI
- Government Track
- Community-Scale Track
- Sign Out

Community Scale | Reports

- Inventories
- Forecasts
- Planning
- Monitoring
- Factor Sets
- Reports

Jurisdiction: Middletown, PA

- Middletown, PA
- Jermyn Borough, PA

Common Reporting Framework

Common Reporting Framework for GCOM

Sector	Sub Sector	Inventory Record	Calculator	Fuel Type	Activity Name	Activity Data	Co2 (Mt)	Ch4 (Mt)	N2 O (Mt)	Co2e (Mt)	Co2 Emissions Factor	Co2 Emissions Factor Units	Ch4 Emissions Factor	Ch4 Emissions Factor Units	N2 O Emissions Factor	N2 O Emissions Factor Units	Direct Entry Co2 (Mt)	Direct Entry Ch4 (Mt)	Direct Entry N2 O (Mt)	Notation Keys	Gpc Reference Number	Information Only	Notes
Stationary Energy	Residential	Middletown, PA Residential Energy	Emissions from Grid Electricity		Electricity Energy Equivalent (MMBtu)	449,957.498293515	42,815.1795662754	3.6478	0.47840	43,044.0961731809	0.095154	MT/MMBtu	8.1071×10^{-6}	MT/MMBtu	1.0632×10^{-6}	MT/MMBtu					I.1.2	false	
Stationary Energy	Residential	Middletown, PA Natural Gas	Emissions from Stationary Fuel Combustion	Natural Gas	Energy Equivalent (MMBtu)	473,000.0	25,078.46	2.365	0.0473	25,157.2145	53.02	kg/MMBtu	0.005	kg/MMBtu	1×10^{-4}	kg/MMBtu					I.1.1	false	
Stationary Energy	Residential	Middletown, PA LPG	Emissions from Stationary Fuel Combustion	LPG	Energy Equivalent (MMBtu)	29,071.356	1,830.91400088	0.31599	0.031599	1,848.13561938	62.98	kg/MMBtu	0.010870	kg/MMBtu	0.0010870	kg/MMBtu					I.1.1	false	
Stationary Energy	Residential	Middletown, PA Kerosine	Emissions from Stationary Fuel Combustion	Kerosene	Energy Equivalent (MMBtu)	522,589.725	39,298.74732	5.8066	0.38710	39,563.9132175	75.2	kg/MMBtu	0.011111	kg/MMBtu	7.4074×10^{-4}	kg/MMBtu					I.1.1	false	
Stationary Energy	Commercial	Middletown, PA Commercial Energy	Emissions from Grid Electricity		Electricity Energy Equivalent (MMBtu)	750,631.392491468	71,425.4523582604	6.0854	0.79809	71,807.3372964103	0.095154	MT/MMBtu	8.1071×10^{-6}	MT/MMBtu	1.0632×10^{-6}	MT/MMBtu					I.2.2	false	Commercial and Industrial energy data is combined. Thank you
Stationary Energy	Commercial	Middletown, PA LPG	Emissions from Stationary Fuel Combustion	LPG	Energy Equivalent (MMBtu)	21,326.888	1,343.16740624	0.23181	0.023181	1,355.80126924		kg/MMBtu		kg/MMBtu		kg/MMBtu					I.2.1	false	
Stationary Energy	Commercial	Middletown, PA Kerosene	Emissions from Stationary Fuel Combustion	Kerosene	Energy Equivalent (MMBtu)	453,983.94	34,139.592288	5.0443	0.33628	34,369.947102		kg/MMBtu		kg/MMBtu		kg/MMBtu					I.2.1	false	
Stationary Energy	Commercial	Middletown, PA Natural Gas	Emissions from Stationary Fuel Combustion	Natural Gas	Energy Equivalent (MMBtu)	489,000.0	25,926.78	2.445	0.0489	26,008.1985		kg/MMBtu		kg/MMBtu		kg/MMBtu					I.2.1	false	

Sector	Sub Sector	Inventory Record	Calculator	Fuel Type	Activity Name	Activity Data	Co2 (Mt)	Ch4 (Mt)	N2 O (Mt)	Co2e (Mt)	Co2 Emissions Factor	Co2 Emissions Factor Units	Ch4 Emissions Factor	Ch4 Emissions Factor Units	N2 O Emissions Factor	N2 O Emissions Factor Units	Direct Entry Co2 (Mt)	Direct Entry Ch4 (Mt)	Direct Entry N2 O (Mt)	Notation Keys	Gpc Reference Number	Information Only	Notes
Transportation	On-Road	Middletown, PA Diesel	On Road Transportation	Diesel	On Road VMT	305,870.0	32,758.4787			32,758.4787	0.073934	MT/MMBtu	0.0	MT/mile	0.0	MT/mile					II.1.1	false	
Transportation	On-Road	Middletown, PA Gas	On Road Transportation	Gasoline	On Road VMT	30,587.0	106,604.55622			106,604.55622	0.07024	MT/MMBtu	0.0	MT/mile	0.0	MT/mile					II.1.1	false	
Transportation	Rail	Middletown, PA Rail Diesel	Rail Transportation	Diesel	Energy Equivalent (MMBtu)	567.16	41.932	0.0032856	0.0010678	42.307	0.073934	MT/MMBtu	$5.7931 x10^{-6}$	MT/MMBtu	$1.8828 x10^{-6}$	MT/MMBtu					II.2.1	false	
Transportation	Rail	Middletown, PA Rail Electricity	Rail Transportation	Electricity	Energy Equivalent (MMBtu)	8,139.88737201365	774.54	0.065991	0.0086545	778.68	0.095251	MT/MMBtu	$8.1154 x10^{-6}$	MT/MMBtu	$1.0643 x10^{-6}$	MT/MMBtu					II.2.2	false	
Waste	Solid waste disposal	Commercial Waste (Multiple Providers) - Landfilled	Waste Generation (Alternative)		Waste Generated (wet tons)	11,710.47166		158.09		4,426.55828748											III.1.2	false	
Waste	Solid waste disposal	Multi-Family Residential Waste (Multiple Providers) - Landfilled	Waste Generation (Alternative)		Waste Generated (wet tons)	1,792.78875		24.203		677.67											III.1.2	false	see attachment
Waste	Solid waste disposal	Commercial Waste (WM)	Waste Generation (Alternative)		Waste Generated (wet tons)	3,408.0		46.008		1,288.224											III.1.2	false	
Waste	Solid waste disposal	Residential Waste (WM)	Waste Generation (Alternative)		Waste Generated (wet tons)	19,015.72		241.74		6,768.645534											III.1.1	false	
Waste	Incineration and open burning	Multi-Family Residential Waste (Multiple Providers) - Combusted	Combustion of Solid Waste Generated by the Community		In-Boundary Energy From Solid Waste (MMBtu)	17,927.8875	585.38	0.57369	0.075297	621.40	0.032652	MT/MMBtu	$3.2 x10^{-5}$	MT/MMBtu	$4.2 x10^{-6}$	MT/MMBtu					VI.1	false	see attachment
Waste	Incineration and open burning	Commercial Waste (Multiple Providers) - Combusted	Combustion of Solid Waste Generated by the Community		In-Boundary Energy From Solid Waste (MMBtu)	117,104.7166	3,823.7032064232	3.7474	0.49184	4,058.9665820726	0.032652	MT/MMBtu	$3.2 x10^{-5}$	MT/MMBtu	$4.2 x10^{-6}$	MT/MMBtu					VI.1	false	see attachment
Waste	Incineration and open burning	Residential Waste (AD)	Combustion of Solid Waste Generated by the Community		In-Boundary Energy From Solid Waste (MMBtu)	2,480.0	80.977	0.07936	0.010416	85.959	0.032652	MT/MMBtu	$3.2 x10^{-5}$	MT/MMBtu	$4.2 x10^{-6}$	MT/MMBtu					VI.1	false	

Appendix II: Climate Change Science

The Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report affirms that "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" (IPCC, 2014, p. 151). Researchers have made progress in their understanding of how the Earth's climate is changing in space and time through improvements and extensions of numerous datasets and data analyses, broader geographical coverage, better understanding of uncertainties and a wider variety of measurements (IPCC, 2014). These refinements expand upon the findings of previous IPCC Assessments – today, observational evidence from all continents and most oceans shows that "regional changes in temperature have had discernible impacts on physical and biological systems" (IPCC, 2014, p. 151).

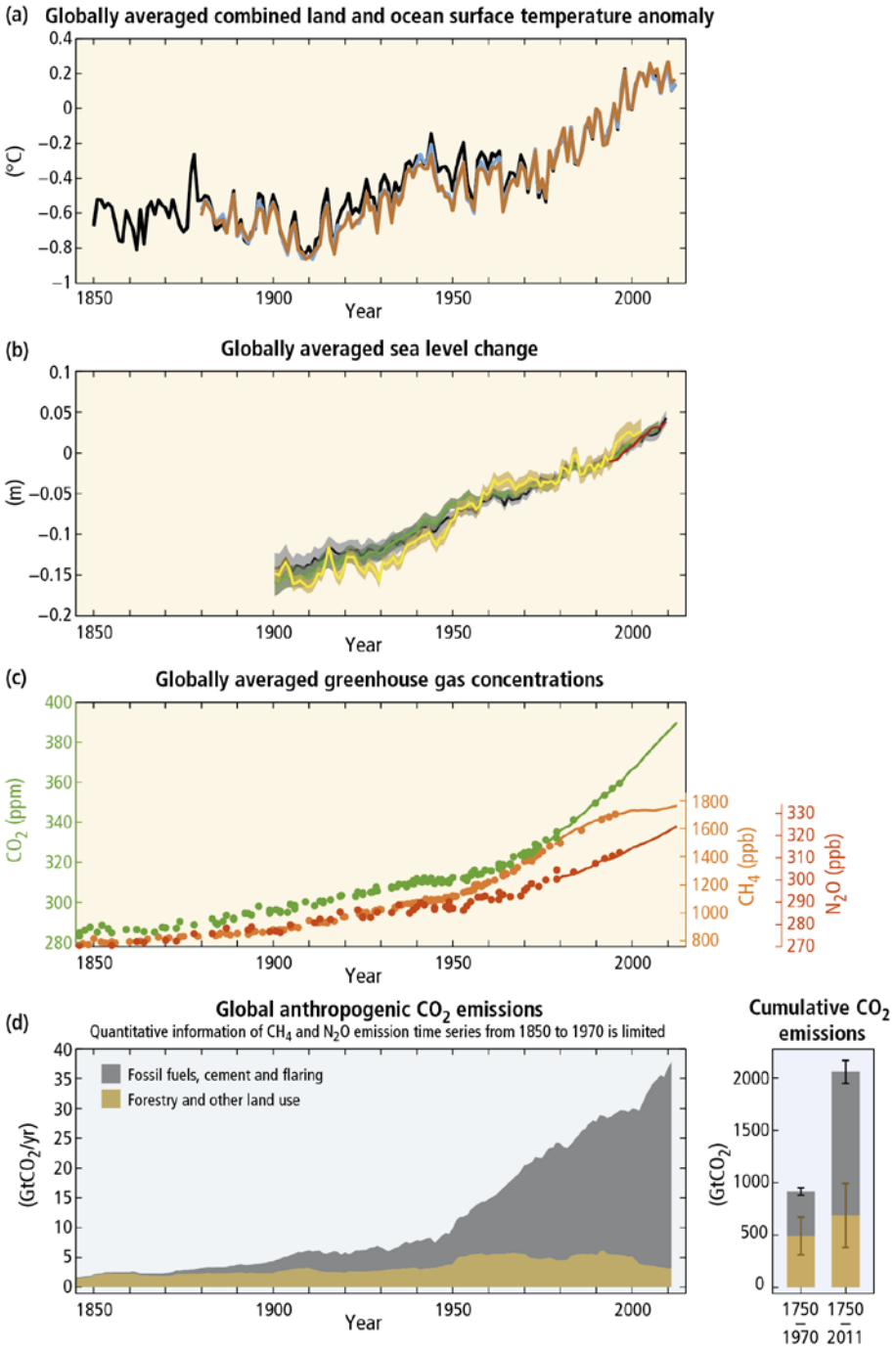

Figure 1Observations and other indicators of a changing global climate system

The Fifth Assessment also asserts that "it is *extremely likely* that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcings together. Globally, economic and population growth continued to be the most important drivers of increases in CO2 emissions from fossil fuel combustion. Changes in many extreme weather and climate events have been observed since about 1950. Some of these changes

have been linked to human influences, including a decrease in cold temperature extremes, an increase in warm temperature extremes, an increase in extreme high sea levels and an increase in the number of heavy precipitation events in a number of regions" (IPCC, 2014, p. 151).

In short, the Earth is already responding to climate change drivers introduced by mankind.

Temperatures and Extreme Events are Increasing Globally

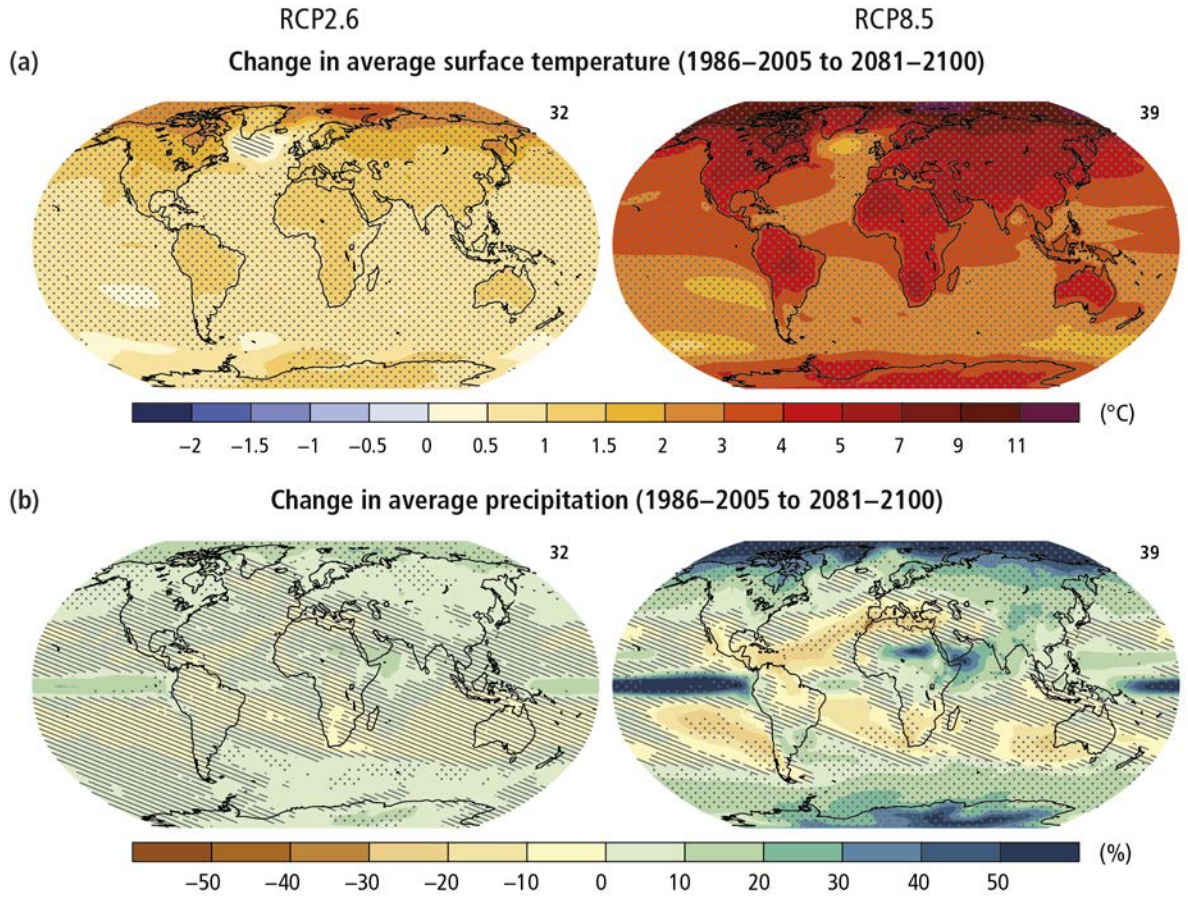

Figure 2 Change in average surface temperature (a) and change in average precipitation (b) based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios.

Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level to rise. Changes in many extreme weather and climate events have been observed since about 1950. Some of these changes have been linked to human influences, including a decrease in cold temperature extremes, an increase in warm temperature extremes, an increase in extreme high sea levels and an increase in the number of heavy precipitation events in a number of regions (IPCC, 2014).

Climate Risks

Climate change is projected to undermine food security. Due to projected climate change by the mid-21st century and beyond, global marine species redistribution and marine biodiversity reduction in sensitive regions will challenge the sustained provision of fisheries productivity and other ecosystem services. For wheat, rice and maize in tropical and temperate regions, climate change without adaptation is projected to negatively impact production for local temperature increases of 2°C or more above late 20th century levels, although individual locations may benefit. Global temperature increases of ~4°C or more above late 20th century levels, combined with increasing food demand, would pose large risks to food security globally. Climate change is projected to reduce renewable surface water and groundwater resources in most dry subtropical region, intensifying competition for water among sectors.

Until mid-century, projected climate change will impact human health mainly by exacerbating health problems that already exist. Throughout the 21st century, climate change is expected to lead to increases in ill-health in many regions and especially in developing countries with low income, as compared to a baseline without climate change. Health impacts include greater likelihood of injury and death due to more intense heat waves and fires, increased risks from foodborne and waterborne diseases and loss of work capacity and reduced labor productivity in vulnerable populations. Risks of undernutrition in poor regions will increase. Risks from vector-borne diseases are projected to generally increase with warming, due to the extension of the infection area and season, despite reductions in some areas that become too hot for disease vectors.

In urban areas climate change is projected to increase risks for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges. These risks are amplified for those lacking essential infrastructure and services or living in exposed areas. Rural areas are expected to experience major impacts on water availability and supply, food security, infrastructure and agricultural incomes, including shifts in the production areas of food and non-food crops around the world.

Climate change is projected to increase displacement of people. Populations that lack the resources for planned migration experience higher exposure to extreme weather events, particularly in developing countries with low income. Climate change can indirectly increase risks of violent conflicts by amplifying well-documented drivers of these conflicts such as poverty and economic shocks (IPCC, 2014).

Greenhouse Gas Emissions Must be Reduced

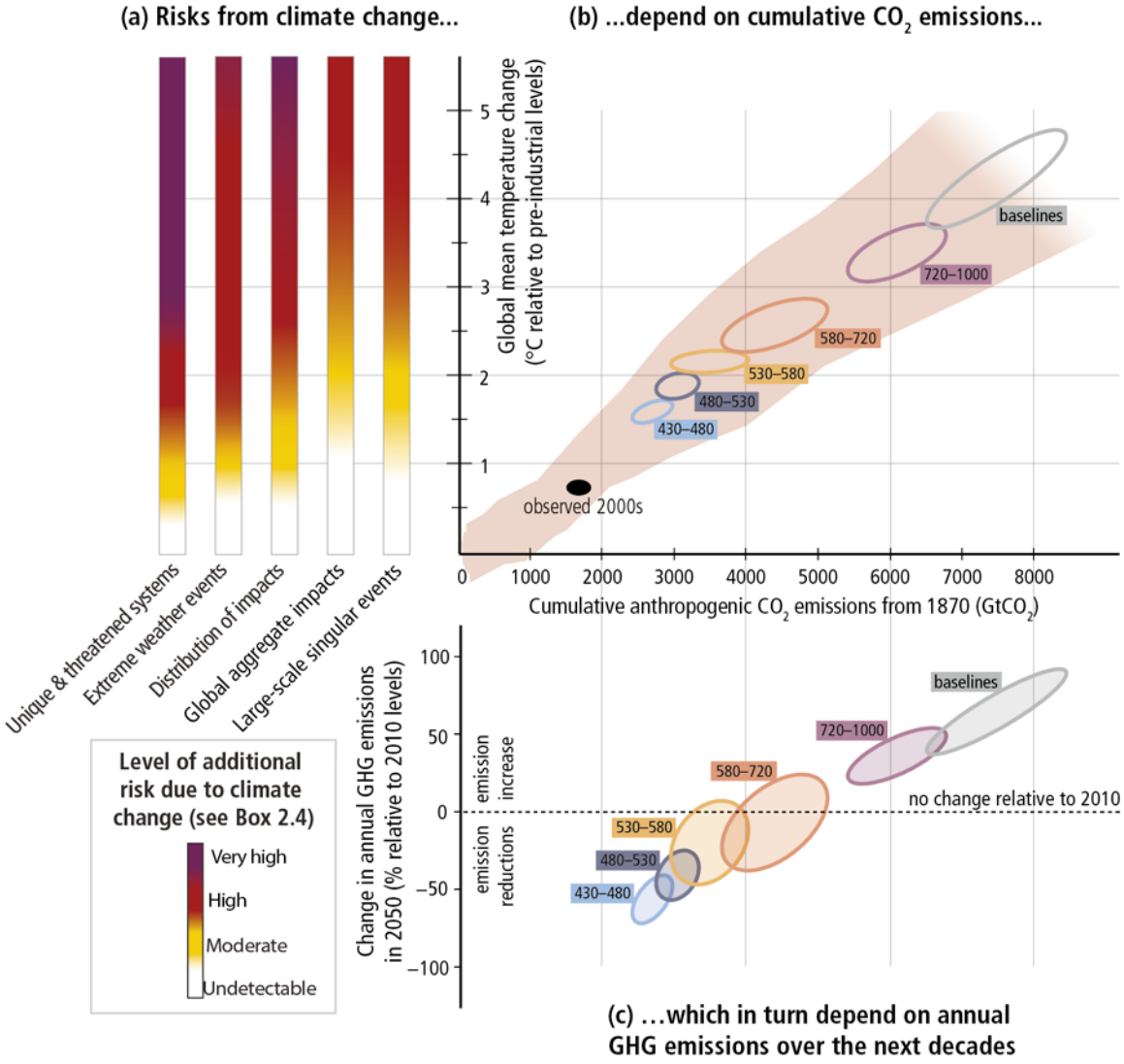

Figure 3 The relationship between risks from climate change, temperature change, cumulative carbon dioxide (CO2) emissions and changes in annual greenhouse gas (GHG) emissions by 2050.

Limiting risks across Reasons For Concern (a) would imply a limit for cumulative emissions of CO2 (b) which would constrain annual GHG emissions over the next few decades (c). Panel A reproduces the five Reasons For Concern. Panel b links temperature changes to cumulative CO2 emissions (in GtCO2) from 1870. They are based on Coupled Model Intercomparison Project Phase 5 simulations (pink plume) and on a simple climate model (median climate response in 2100), for the baselines and five mitigation scenario categories (six ellipses). Panel C shows the relationship between the cumulative CO2 emissions (in GtCO2) of the scenario categories and their associated change in annual GHG emissions by 2050, expressed in percentage change (in

percent GtCO2-eq per year) relative to 2010. The ellipses correspond to the same scenario categories as in Panel B, and are built with a similar method (IPCC, 2014).

The recent and massive buildup of greenhouse gases in our atmosphere is conceivably even more extraordinary than changes observed thus far regarding temperature, sea level, and snow cover in the Northern hemisphere in that current levels greatly exceed recorded precedent going back much further than the modern temperature record.

Anthropogenic greenhouse gas emissions have increased since the pre-industrial era driven largely by economic and population growth. From 2000 to 2010 emissions were the highest in history. Historical emissions have driven atmospheric concentrations of carbon dioxide, methane and nitrous oxide to levels that are unprecedented in at least the last 800,000 years, leading to an uptake of energy by the climate system (IPCC, 2014).

In response to the problem of climate change, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, and waste diversion, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts. While this Plan is designed to reduce overall emissions levels, as the effects of climate change become more common and severe, local government adaptation policies will be fundamental in preserving the welfare of residents and businesses.

Appendix III: Community Climate Survey

Community engagement is a critical element to any long-term community planning document. Recognizing this, the project team developed a web-based survey to get feedback from the community about their awareness of climate change, interest in reducing their own greenhouse gas emissions, perceptions about climate action, and suggestions about how to make community-wide reductions in greenhouse gas emissions. The following trends and themes were observed as a result of the 64 responses received in this survey:

- 67.2% of survey respondents were over the age of 50.
- 82.8% selected that they "[are] well informed on climate change."
- 76.6% indicated Climate Change is an important issue to them (selecting "4" or "5" on a scale of 1-5).
- Renewable energy was identified as the most important way to address the environment, closely followed by energy efficiency.
- 87.5% stated that they have installed high-efficiency light bulbs in their home.
- 60.9% stated that they have upgraded their water heater.
- 45.3% stated they had not, but were interested in installing solar panels on their home or business, while 43.8% stated they were not interested in installing solar panels.
- 43.8% stated they had not, but were interested in upgrading their home's insullation.
- When asked about why they were not considering one or more home energy options, the most common concerns and perceptions were:
    - The cost of solar panels,
    - The benefits of energy efficency not being worth the effort,
    - The fear of losing property value,
    - The appearance of solar panels, and
    - Respondents living in a property they do not own.
- 29.7% stated they currently walk or bike to local destinations, while another 50.0% stated they would be interested in doing so.

- 46.9% stated they were interested in using public bus or other mass transit system.
- 43.8% stated they were interested in purchasing a hybrid or electric vehicle.
- 45.3% stated they were *not* interested in carpooling or ridesharing.
- When asked about why they were not considering one or more transportation-related emission-reducing activities, the most common concerns and perceptions were:
    - Not having someone to carpool with,
    - Being retired and/or not being able to carpool,
    - The cost of hybrid and electric vehicles,
    - Poor walkability near their home or destination(s)
    - Fear of health being jeopardized in a multi-person transportation option
    - Too old to consider transportation alternatives, and
    - Existing public transportation routes not providing access to desired destinations.
- 42.2% indicated interest in a low or no-interest community loan program to make envrionmentally-friendly home improvements, such as sidewalk replacement or residential heating replacement (selecting “4” or “5” on a scale of 1-5).
- 90.6% indicated it is important that Middletown Township is environmentally responsible (selecting “4” or “5” on a scale of 1-5).
- The following ideas were suggested as future climate action initiatives:
    - Education/awareness on the following topics:
        - How to properly dispose of recyclables, solid waste, and hazardous waste;
        - How to compost;
        - How to reduce water use and conserve resources;
        - What climate change is; and
        - How to get involved in climate action;
    - Add more electric vehicle charging stations;
    - Green business recognition program;
    - Add solar panels at Township facilities;
    - Expand sidewalk and bike lane network;

- Protect green spaces in the Township;
- Plant more trees when others are cut down;
- Litter abatement/clean-up programs;
- Incentive programs for residential and commercial efficiency upgrades;
- Create a community composting program;
- Transition to altneratives to single-use plastic bags;
- Explore alternatives to road salt and brine for snow and ice removal;
- Increase frequency of recycling collection; and
- Encourage businesses to turn off unnecessary lights.